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A SURVEY OF U.S. NAVY MEDICAL COMMUNICATIONS AND EVACUATIONS AT SEA

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A SURVEY OF U.S. NAVY MEDICAL COMMUNICATIONS AND EVACUATIONS AT SEA

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EXECUTIVE SUMMARY

A 9-month study of all U.S. Navy surface ships (N = 354), Pacific Fleet submarines (N = 42), and all ships of the Military Sealift Command (N = 54) was conducted to (1) document the frequency of, and diagnostic factors precipitating, medical communications and evacuations, and (2) determine the potential need for telemedicine capabilities aboard ship. Supplementary analyses were conducted to identify operational and medical staffing factors associated with patient visit rate at sea.

Patient visit rates per 1,000 man-days at sea were found to be somewhat higher during the first few days of an at-sea period, during weekdays rather than weekends, on ships with a lower crew to medical staff ratio, and aboard Pacific Fleet rather than Atlantic Fleet ships. The average Navywide patient visit rate was 18 visits per 1,000 man-days at sea.

During the course of the study, a total of 752 medical communications and 743 Medevacs were documented aboard ships at sea. These figures extrapolate to an annual incidence of 1,003 medical communications and 991 Medevacs. The majority of the medical communications were initiated by independent duty corpsmen aboard surface ships, were transmitted by radio-telephone or message, and were directed to a ship with a physician aboard. In the majority of cases in which a communication occurred (62%), the patient was subsequently Medevaced.

The rate of Medevacs per 1,000 patient visits was significantly higher among ships with an independent duty corpsman (mean = 3.5) than among ships with a physician (mean = 1.5). Because of large patient volume, however, aircraft carriers initiated a greater number of Medevacs per ship than any other ship type. The majority of Medevac patients were transported by helicopter and were frequently sent to shore-based facilities (62%). Most Medevacs occurred in the Western Pacific, the Mediterranean, and in CONUS Pacific waters.

The principal diagnostic categories associated with both Medevacs and medical communications included injuries, primarily fractures and lacerations; and digestive problems, primarily teeth and supporting structures and suspected appendicitis. On a case-by-case basis, senior medical department representatives indicated that 46% of the medical communications could have been improved significantly and 28% of the Medevacs probably could have been prevented if they had had the ability to transmit data through medical telecommunications technologies. The ability to transmit X-ray images, TV image of body part, and voice communications from sick bay were the technologies most frequently identified as potentially positive adjuncts. Because most ships do not have an X-ray capability on board, these data indicate a perceived need for both X-ray equipment and the ability to transmit X-ray images during a remote consultation.

The magnitude of this project, the scope of the results, and the detail of the Appendices were intended to make this report a useful reference document and an important point of departure toward a more complete understanding of shipboard health care delivery and medical decision-making.

A Survey of U.S. Navy Medical Communications and Evacuations at Sea

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Due to a host of organizational, environmental, and operational factors, the medical departments aboard U.S. Navy ships represent a distinct and specialized sector of the health care system. The majority of these medical departments are headed by an independent duty corpsman who, unlike many nonphysician health care providers, functions with a great deal of autonomy and is responsible for all aspects of primary health care delivery.

Although numerous studies indicate that nonphysician practitioners deliver medical care in a manner that maintains both quality of care and patient satisfaction,[1] efforts continue to enhance the level of support available for medical decision-making and primary care delivery. Over the past several years, the U.S. Navy has focused increasing attention on the development and implementation of clinical algorithms and telemedicine systems to enhance medical support for the operating forces at sea.

Clinical algorithms typically invoke binary logic formats to provide unambiguous, step-by-step instructions for clinical problem solving.[2] These algorithms, often presented in multipart checklists, have been used successfully in the training of physicians' assistants, patient triage, and the diagnosis and management of acute illnesses in a number of outpatient settings.[2-4]

The U.S. Navy has developed a computer assisted clinical algorithm system for use aboard submarines.[5-7] Although initial work focused upon acute abdominal pain, future programs will include a variety of modules for the diagnosis and management of other acute illnesses, continuing medical training, and Medical Department administration.

Telemedicine represents another technique to support the delivery of primary health care in remote areas. The term telemedicine generally refers to the use of telecommunications technology to enhance the exchange of medical information between a network of geographically isolated health care providers and a central source of medical expertise.* Although these systems vary in network size, system capability, and technical parameters, they generally share the following components: (1) a central source of medical expertise and diagnostic and therapeutic technology, (2) one or more remote entry points staffed typically by nonphysician health care providers, (3) a communications system linking remote entry points to the central resource, and (4) a transportation system.[11]

In order to further enhance its worldwide primary care capability, the U.S. Navy has developed a telemedicine system, the Remote Medical Diagnosis System (RMDS), for use aboard ship and in remote shore-based facilities. This system has the capability of point-to-point exchange of television images (e.g., X-ray, body part), electrocardiograms (ECGs), electronic stethoscope sounds, and voice communications.[12-13]

As these and other medical decision-making technologies continue to develop in the Navy, it becomes increasingly important to understand more fully the structure of shipboard medical departments and the process of health care delivery at sea. The purpose of the present study was to (1) summarize the medical department structure aboard various types of ships, (2) identify operational factors associated with patient visit rate, (3) document the frequency of, and diagnostic factors precipitating, medical communications and evacuations (Medevac), and (4) determine the potential need for telemedicine capabilities aboard ship.

METHODS

Selection of the Population

Due to the potential value of U.S. Navy medical communication and evacuation data, and the uncertainties associated with survey compliance and Medevac incidence rates, all ships and submarines in the U.S. Navy (N = 529) and in the Military Sealift Command (N = 58) were initially included in the study. A high-level administrative decision, however, subsequently precluded the involvement of submarines of the Atlantic Fleet (N = 92). An additional 45 ships undergoing decommissioning or major shipyard overhauls were also excluded from the study. Therefore, the final sample included 396 U.S. Navy ships and submarines, and 54

*For a general review of the issues in telemedicine, the reader is referred to the literature.[8-10]

ships of the Military Sealift Command (MSC). A detailed summary of the sample by ship type and type command is presented in Appendix A.

Design and Procedure

Instruments. The survey protocol consisted of (1) a Medical Department Structure Questionnaire, (2) a series of nine monthly Medical Communication Logs, and (3) a packet of 15 Medevac Report Forms. The Medical Department Structure Questionnaire assessed the number of shipboard medical and dental department staff within each pay grade, including strikers, and identified major medical equipment (e.g., X-ray, ECG, Life-Pac 5/6) and support personnel (X-ray and laboratory technicians) aboard. This information was collected at the beginning and at the end of the survey.

The monthly Medical Communication Log required a daily assessment of operating status (in port or at sea)* and number of patient visits. Due to different administrative requirements between the Pacific and Atlantic Fleets, patient visits were recorded only during at-sea periods for the Atlantic Fleet. In the Pacific Fleet, ships reported daily patient visits both at sea and in port, and provided additional information regarding in-port patient referral patterns. The average ship's strength, including embarked personnel, was also obtained from all ships each month.

Medical communications initiated for the purpose of assisting medical department personnel in the diagnosis, treatment, or other clinical management of a patient were documented on an "as occurs" basis. This documentation included date, ship or station contacted, patient rate/rank and division, mode of communication, reason for the communication, recommendation received, and degree of helpfulness of the communication. In addition, the potential utility of a telemedicine system was assessed for each communication by having the medical department representative respond to the following question, "Would the capability to transmit any of the following have significantly improved the consult? (Check if yes)." The checklist included X-ray, Lab Slides, ECG, Electronic Stethoscope, Voice Communication from Sick Bay, TV Image of Body Part, and Other - Specify. Finally, the medical department representative indicated whether or not the

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*If a ship was underway during any period of the 24-hour clock, it was logged as "at sea" for that day.

patient had been Medevaced. These logs were forwarded to the Naval Health Research Center at the end of each month of the survey.

The Medevac Report consisted of a two-part form with a perforated line dividing the top and bottom halves. The top half, which was administratively yoked to the bottom half with a serial number, was completed by the medical department representative who initiated the Medevac.* This form included Medevac date and destination; method of Medevac; reason for Medevac (i.e., diagnosis); miles to destination; miles initiating ship was required to divert, if any; the ship's approximate geographic location; and patient rate/rank and division. In order to assess the potential role of telemedicine in preventing each Medevac, the medical department representative responded to the following question: "Is there a reasonable probability that this Medevac could have been prevented if your Medical Department had the capability to transmit any of the following during a remote consultation with medical specialists? (Check each item.)" The checklist was presented in a "yes-no" format and included X-ray, Lab Slides, ECG, Electronic Stethoscope, Voice Communication from Sick Bay, TV Image of Body Part, and Other - Specify.

In the event of a Medevac, the top half of the Medevac Report was completed by the initiating medical department representative and forwarded to the Naval Health Research Center. The bottom half of the form was detached, forwarded with the patient in his medical record, and completed by the attending physician at the final Medevac destination. On this bottom half, the physician identified the receiving facility, the final diagnosis and disposition, patient rate/rank and division, any adverse effects to the patient incurred during the Medevac, and indicated whether the Medevac was necessary or not. In addition, the physician responded to the following telemedicine-related question: "Is there a reasonable probability that this Medevac could have been prevented if the medical department aboard the originating ship had the capability to transmit any of the following during a remote consultation with medical specialists? (Check each item.)" As on the top half of the form, which had been completed by the medical department representative who had initiated the Medevac, the checklist was presented in a "yes-no" format and included X-ray, Lab Slides, ECG, Electronic Stethoscope, Voice

*A Medevac was defined as the nonroutine transfer of a patient from a ship at sea for the purpose of receiving more definitive medical care.

Communication from Sick Bay, TV Image of Body Part, and Other - Specify. Upon completion, this form was also forwarded to the Naval Health Research Center and integrated with the information from the ship which initiated the Medevac.

Procedure. Prior to the initiation of the survey, a series of project briefings were conducted to gain the endorsement of the fleet surgeons and the force medical officers. Subsequent to these briefings, messages that requested survey participation were sent from the type commanders to the ships and submarines in the fleet. Approximately one month before data collection was scheduled to begin, the survey materials were mailed to the fleet. At the same time, letters were mailed to 65 Navy, Air Force, and Army hospitals to inform them of the survey, familiarize them with the Medevac Report, and request their participation as they received the U.S. Navy Medevacs.

The 9-month survey was conducted from 1 December 1982 through 31 August 1983. During the course of the study, compliance was closely monitored. In the event a monthly Communications Log had not been received by the Naval Health Research Center within 6 weeks of the end of a reporting period, a follow-up message was sent to the ship. Although this procedure ensured a high degree of compliance from the ships (96%) initiating the Medevacs, the response rate from the facilities which received Medevacs was relatively low.

As the study progressed, more active procedures were implemented to obtain follow-up Medevac data from the receiving facilities. Patient's social security number was added to the Medevac Report to facilitate retrospective follow-up, and a separate data collection effort was initiated on each Medevac Report received from an initiating ship. In this effort, each Medevac Report was photocopied, attached to a blank Receiving Station Medevac Report Form, and mailed to the identified receiving facility. These procedural changes substantially improved the collection of follow-up Medevac information.

RESULTS

Due to the scope of the survey, the results will be presented in three sections. In the first section, the medical department structure aboard various types of ships will be summarized, and the relationship between patient visit rate and a number of operational factors will be explored. In the second section, data regarding medical communications will be presented. In the final section, a detailed analysis of the Medevac data will be presented.

Operational Factors and Patient Visit Rate

An inspection of the Medical Department Structure Questionnaire revealed basically three types of shipboard medical departments. As shown in Table 1, the most sophisticated departments are found aboard the aircraft carriers and have the capabilities of a small hospital. These medical departments are typically staffed by approximately 4 physicians, 3 chief petty officers, and 24 corpsmen. In addition, there are a dental officer and dental technicians, a Medical Service Corps officer, and the necessary equipment to support a variety of surgical procedures, inpatient capabilities, and ancillary services. These aircraft carriers are the largest ships in the Navy (mean crew size = 3,829) and have a crew-to-medical staff ratio of 118:1.*

A second general type of shipboard medical department is headed by a relatively junior physician and is located aboard large amphibious, auxiliary, and combatant ships. In addition to the physician, these medical departments are staffed with an average of one chief petty officer and six corpsmen. Approximately 57% of these ships have a dental officer and dental technicians aboard. As shown in Table 1, these medical departments typically have an X-ray machine and ECG capability and are supported with appropriate technical staff. This type of medical department is found aboard large surface ships (mean crew size = 713) which have a crew to medical staff ratio of 83:1.

The third, and most prevalent, type of shipboard medical department typically consists of a relatively senior independent duty corpsman (49% HMCs, 51% E-5 or E-6),** one junior corpsman, and very little technical equipment. As shown in Table 1, this type of medical department is found aboard 77% of all ships in the Navy. These are generally small surface ships and submarines (mean crew size = 256) that have a crew-to-medical staff ratio of 154:1. A detailed listing of the medical department staff and equipment aboard each ship is presented in Appendix B. Dental department staffing information is presented in Appendix C.

Although the development of a comprehensive model of health care utilization at sea is clearly beyond the scope of this study, the data do permit a preliminary analysis of the relationship between a number of operational/medical staffing

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*Medical staff figures do not include nonrated strikers.

**In 42% of the Military Sealift Command ships, there are no medical personnel aboard and medical duties are performed by the First Officer.

TABLE 1

SHIPBOARD MEDICAL DEPARTMENT
STAFFING AND EQUIPMENT CHARACTERISTICS

		STAFF					EQUIPMENT						TECHNICIANS			
	NO. OF SHIPS	PHYSICIANS	HMCs	CORPS-MEN	SHIPS WITH DENTAL STAFF		ECG		LIFEPAK 5/8		X-RAY		X-RAY WITH TECH		LAB TECH	
		Mean	*Mean*	*Mean*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*	*%*	*No.*
A/C Carrier (Physician)	**12**	**3.6**	**2.6**	**24.0**	**100**	**(12)**	**100**	**(12)**	**100**	**(12)**	**100**	**(12)**	**100**	**(12)**	**100**	**(12)**
Surface (Physician)	**77**	**1.0**	**1.2**	**6.1**	**57**	**(44)**	**95**	**(73)**	**84**	**(65)**	**97**	**(75)**	**84**	**(65)**	**75**	**(58)**
Combatant	10	1.0	1.4	4.3	20	(2)	100	(10)	90	(9)	100	(10)	90	(9)	30	(3)
Auxiliary	35	1.1	1.3	5.9	51	(18)	91	(32)	89	(31)	97	(34)	71	(25)	71	(25)
Amphibious	32	1.0	1.1	6.8	75	(24)	97	(31)	78	(25)	97	(31)	97	(31)	94	(30)
[Total Physician Ships:	*89*	*1.4*	*1.4*	*8.5*	*65*	*(56)*	*96*	*(85)*	*87*	*(77)*	*98*	*(87)*	*89*	*(77)*	*79*	*(70)]*
Corpsmen Ships	**305**	**0.0**	**0.5**	**1.2**	**0**	**(0)**	**4**	**(12)**	**2**	**(6)**	**1**	**(3)**	--	--	**4**	**(12)**
Combatant	177	0.0	0.6	1.1	0	(0)	2	(3)	1	(2)	--	--	--	--	3	(6)
Auxiliary	36	0.0	0.4	1.6	0	(0)	19	(7)	--	--	3	(1)	--	--	6	(2)
Amphibious	52	0.0	0.4	1.6	0	(0)	2	(1)	6	(3)	4	(2)	--	--	6	(3)
Submarine	40	0.0	0.2	0.8	0	(0)	3	(1)	3	(1)	--	--	--	--	3	(1)

patient visit rate at sea. Although the total number of patient visits at sea was obviously related to the number of man-days at sea (Figure 1), the focus of this study was upon the determinants of patient visit rate. Patient visit rate was computed for each ship by dividing the number of patient visits at sea by the ship's crew size. For clarity of interpretation, this percentage was multiplied by a constant of 1,000 and expressed later in the paper as patient visits per 1,000 man-days at sea.

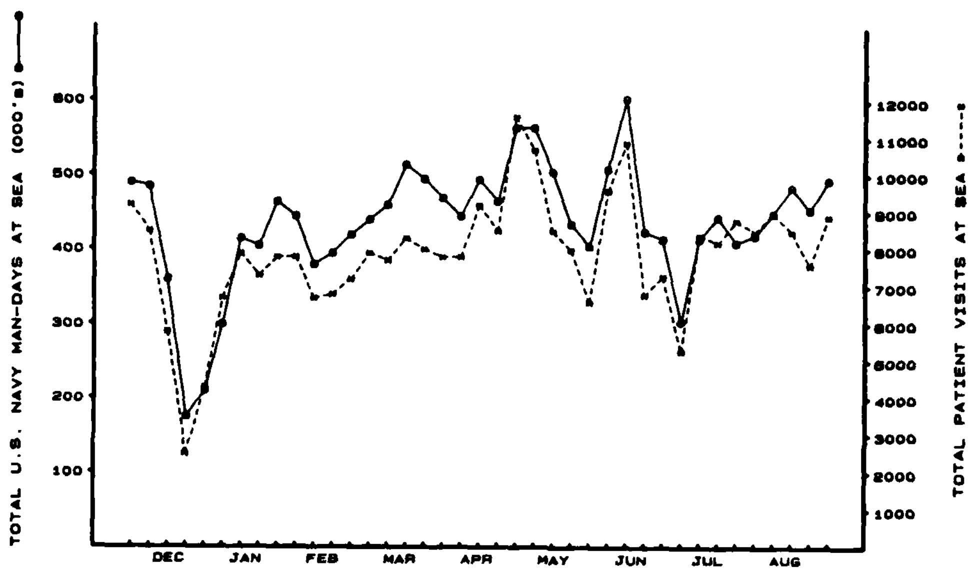

FIGURE 1. WEEKLY FLEET MAN-DAYS AND PATIENT VISITS AT SEA

The medical staffing factors that were considered potentially important determinants of patient visit rate included the presence of a physician aboard, and the crew-to-medical staff ratio. Although these factors were moderately correlated (r = -.41, p < .001), such that ships with a physician aboard had a smaller crew-to-staff ratio, both variables were included because they could exert relatively independent influences on patient visit rate.

The operational variables, which were of potential interest in the study of patient visit rate, included fleet (Atlantic or Pacific); ship type (aircraft carrier, combatant, auxiliary, amphibious); deployment status; and total number of days at sea during the study. Separate analyses that required daily patient visit rate as the unit of analysis were performed to determine the cumulative effect of days at sea during a given underway period and weekday vs. weekend period on patient visit rate. A summary of the major operational characteristics of the various ship types is presented in Appendix D.

A multiple regression procedure was used to determine the effects of the variables deployment status, total days at sea, the presence of a physician aboard, crew-to-staff ratio, fleet, and ship type on patient visit rate. For the purpose of this analysis, the variables deployment status, presence of a physician aboard, and fleet were dichotomized and entered as dummy variables. The variable ship type was linearized by entering the mean patient visit rate for each ship type.

A Pearson product moment correlation analysis of the operational/medical staffing variables and patient visit rate indicated significant zero-order relationships between patient visit rate and the variables crew-to-staff ratio, total days at sea, fleet, and ship type (Table 2). The variables crew-to-staff ratio and total days at sea were then entered into a multiple regression analysis in a stepwise fashion before the variables fleet and ship type. This procedure

TABLE 2

PEARSON CORRELATION COEFFICIENT MATRIX OF OPERATIONAL/MEDICAL STAFFING VARIABLES WITH PATIENT VISIT RATE

	PHYSICIAN	CREW TO STAFF RATIO	FLEET	SHIP TYPE	TOTAL DAYS AT SEA	PATIENT VISIT RATE
Physician 0 - Corpsman 1 - Physician	1.0000 (354) - -					
Crew to Staff Ratio	−0.4051 (351) p=.000	1.0000 (351) - -				
Fleet 1 - Pacific 2 - Atlantic	−0.0457 (354) p=.196	0.0758 (351) p=.078	1.0000 (354) - -			
Ship Type	0.3125 (354) p=.000	−0.5402 (351) p=.000	−0.0770 (354) p=.074	1.0000 (354) - -		
Total Days at Sea	0.0651 (354) p=.111	0.0943 (351) p=.039	0.0663 (354) p=.107	−0.0958 (354) p=.036	1.0000 (354) - -	
Patient Visit Rate	−0.0679 (340) p=.106	−0.1392 (339) p=.005	−0.2505 (340) p=.000	0.1627 (340) p=.001	−0.1087 (340) p=.023	1.0000 (340) - -

permitted an assessment of the contribution of fleet and ship type after the effects of crew-to-staff ratio and total days at sea had been statistically controlled.

As shown in Table 3, the results of this analysis indicated that patient visit rate was significantly associated with crew-to-staff ratio and fleet. Ships with larger crew-to-staff ratios and ships in the Atlantic Fleet had lower patient visit rates (Figure 2). Although these variables demonstrated statistically significant relationships with patient visit rate, the magnitude of the effect was

TABLE 3

MULTIPLE REGRESSION ANALYSIS OF OPERATIONAL/MEDICAL STAFFING VARIABLES WITH PATIENT RATE

Variables	Multiple R	R^2	β	t	p
Crew-to-staff ratio	**.14**	**.02**	**–.12**	**2.3**	**<.02**
Fleet	**.28**	**.08**	**–.24**	**4.6**	**<.01**

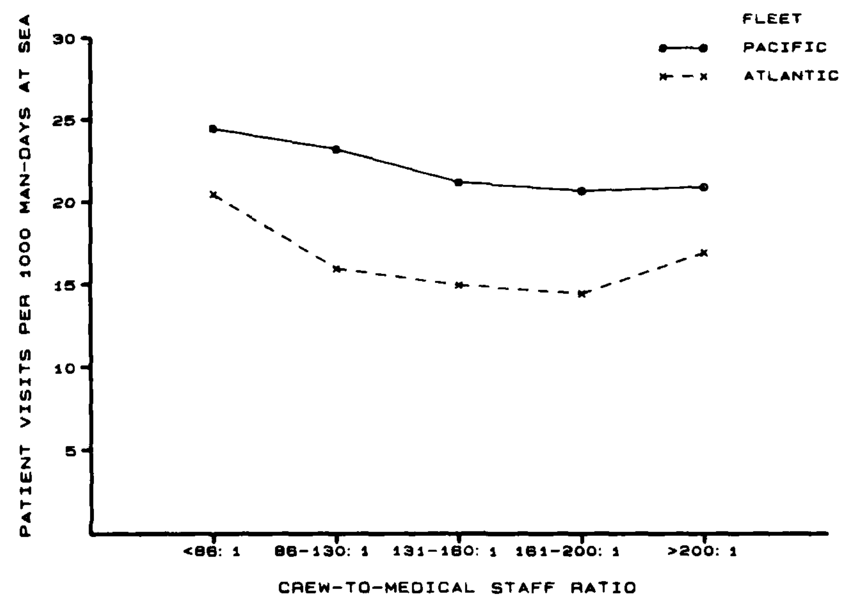

FIGURE 2. PATIENT VISIT RATE BY FLEET AND CREW-TO-STAFF RATIO

relatively small. The combined effects of crew-to-staff ratio and fleet accounted for only about 8% of the variance in patient visit rate.

Using daily patient visit rate as the level of analyses, the effect of number of consecutive days at sea during a given underway period and of weekend vs. weekday were explored. In order to assess the effect of consecutive days at sea, the average daily patient visit rate for all ships at sea for a period of 12 days or less* was plotted (Figure 3). This curve approximated a negatively sloped logarithmic function [$\underline{y}' = 26.5 + (-3.4) \log \underline{X}$, $\underline{r}^2 = .80$] and indicated a generally higher patient visit rate during the first few days at sea. These data suggest that patient visit rates for the broad majority of at-sea periods were more affected by the transition from shore to sea than by the cumulative effect of days at sea. A plot of the average patient visit rate during each day of the week indicated a generally decreasing patient visit rate from Monday through Saturday

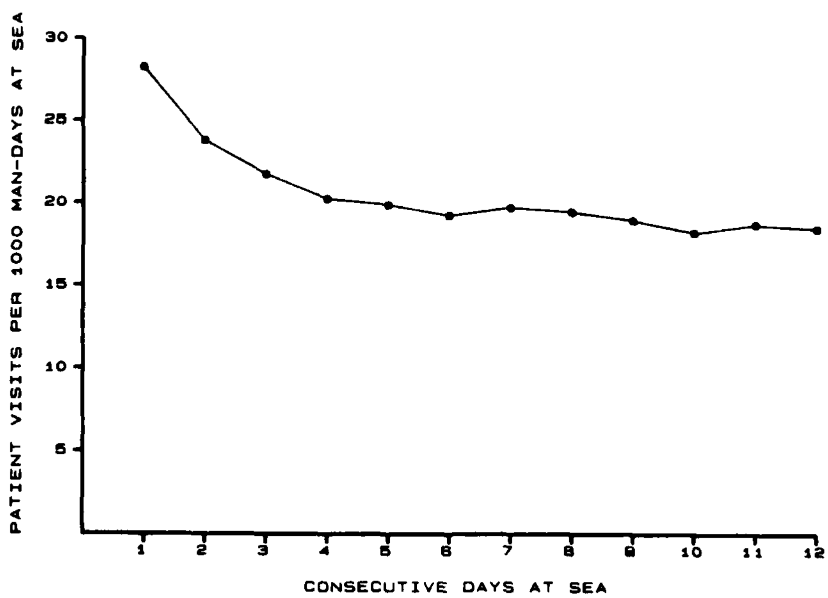

FIGURE 3. PATIENT VISIT RATE BY CONSECUTIVE DAYS AT SEA

*At-sea periods of 12 days or less constituted 85% of all at-sea periods.

and a precipitous drop on Sunday (Figure 4). The average patient visit rate for all ships over the entire study was 18 patient visits per 1,000 man-days at sea. In other words, approximately 1.8% of a ship's crew can be expected to visit sick bay on an average day at sea.

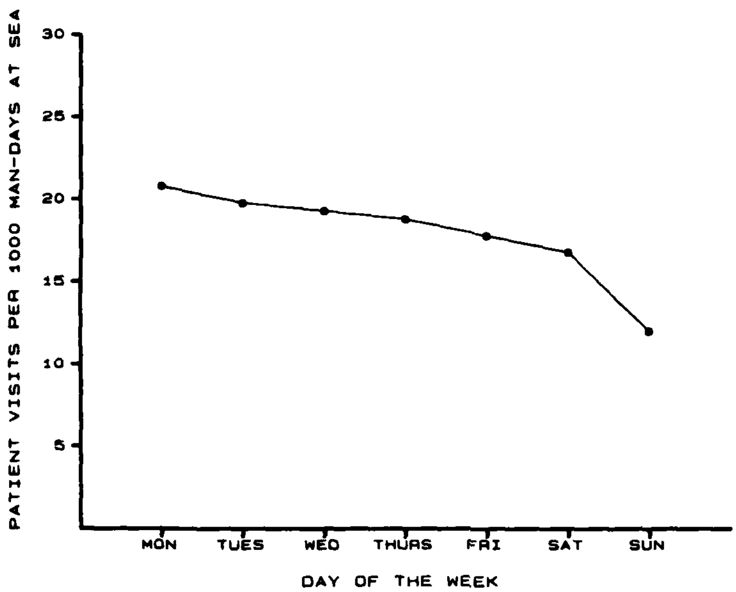

FIGURE 4. PATIENT VISIT RATE BY DAY OF WEEK

In addition to information regarding patient visits at sea, Pacific Fleet ships provided patient visit and referral data during in-port periods. During this study, Pacific Fleet ships reported 110,758 patient visits while in port. The majority of these visits occurred aboard ships with physicians (65%) and approximately 11% of all in-port visits were referred off the ship. In general, independent duty corpsmen referred patients at a substantially higher rate (18%) than physicians (7%). Although the majority of physician referrals (90%) were directed to specialty clinics (SF 513), the independent duty corpsmen referrals were approximately evenly divided between specialty clinics and general medical referrals (SF 600). Overall, about two-thirds of all referrals involved specialty clinics.

As shown in Table 4, the specialty clinics which were most frequently consulted included orthopedics, ENT, dermatology, and dental. Although specific information was requested regarding the probable diagnoses for general medical referrals, these data were not provided in 40% of the cases. When data were provided, the leading reasons for general medical referrals included respiratory, alcohol/drug, and musculoskeletal problems.

TABLE 4

CATEGORIES OF PATIENT REFERRALS OF PACIFIC FLEET SHIPS WHILE IN PORT

PROBLEMS REFERRED TO SPECIALTY CLINICS (513s)	PERCENTAGE OF ALL 513s*	PROBLEMS REFERRED TO GENERAL CLINICS (600s)	PERCENTAGE OF ALL 600s**
Orthopedics	12	ER/General Clinic	40
ENT	11	Respiratory	12
Dermatology	10	Alcohol/Drug	8
Dental	10	Musculoskeletal	8
Optometry	8	Infectious Disease	7
Psychiatry	7	Skin	5
Urology	7	Accidents	4
Opthalmology	7		
Internal Medicine	7		

*Categories account for 88% of the total 7,720 513s.

**Categories account for 83% of the total 3,984 600s.

Medical Communications

In this study, a medical communication was defined as any ship-to-ship or ship-to-shore communication for the purpose of assisting medical department personnel in the diagnosis, treatment, or other clinical management of a patient. Analyses in the following section assess the frequency of medical communications, the nature of these communications, and the potential value of shipboard medical telecommunications systems to improve medical communications.

Frequency of Medical Communications. In order to provide a comprehensive overview, shipboard medical communications were assessed in terms of both frequencies and rates. The frequency data provided a basis for comparing the volume of medical communications initiated by different ship types. The rate data, as indexed by number of communications per 1,000 patient visits, provided an estimate of the relative frequency with which various health care providers requested assistance with the clinical management of their patients. During the course of this 9-month study, a total of 752 medical communications were initiated from ships at sea (Atlantic = 353; Pacific = 399). The majority of these communications (53%) were initiated from combatant ships with an independent duty corpsman as the senior medical department representative (see Figure 5); however, this distribution of communications was due, in part, to the large representation of these ships in the sample. Submarines were not included in Figure 5 because data from SUBLANT were not available. If one assumes an equivalency between the number of SUBLANT and SUBPAC medical communications, submarines would account for 4% of all medical communications. The average number of communications per ship within ship type is presented in Appendix E.

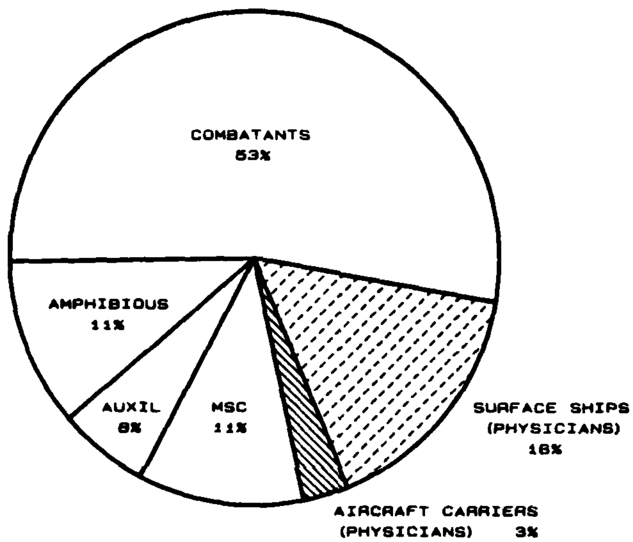

FIGURE 5. MEDICAL COMMUNICATIONS AT SEA BY SHIP TYPE (N = 752)

As shown in Figure 6, the medical communication rate per 1,000 patient visits was significantly higher among U.S. Navy surface ships with an independent duty corpsman (mean 1.4) than among ships with a physician aboard (mean = .7) [$t(319) = 4.3$, $p < .001$]. While the difference in communication rate between physicians and independent duty corpsmen was consistent in both Atlantic Fleet and Pacific Fleet ships, the overall medical communication rate was not significantly different between the two fleets.

Among the U.S. Navy surface ships with an independent duty corpsman aboard, the difference in communication rates between ship types was not significant in either the Atlantic or the Pacific Fleet. Similarly, the communication rate for senior medical department representatives who were chief petty officers was not significantly different from the rate for those senior medical department representatives who were not chief petty officers (i.e., E-5 and E-6). The generally low medical communication rate for Pacific Fleet submarines was probabiy due to the more stringent electronic emission contol standards placed on submarines for security reasons.

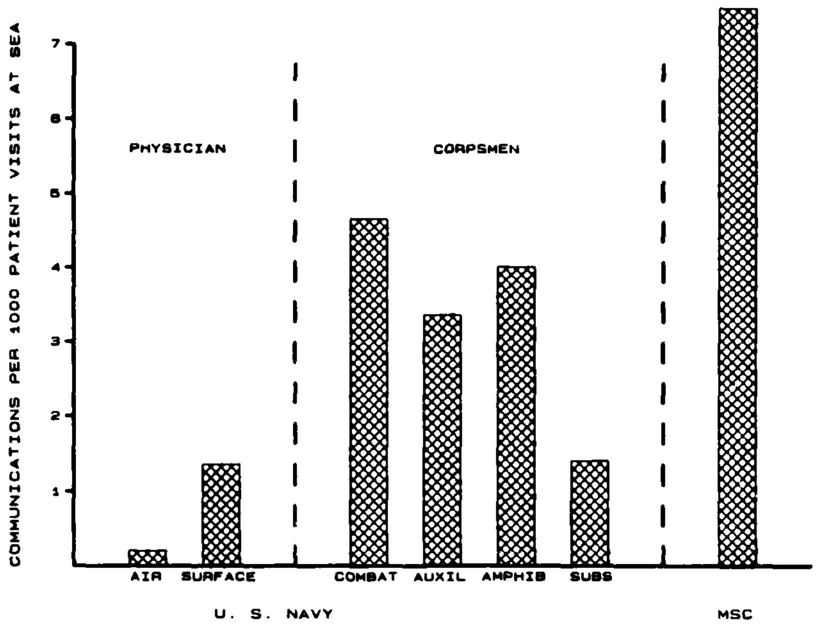

FIGURE 8. MEDICAL COMMUNICATION RATE AT SEA

Nature of Medical Communications. In the majority of medical communications (59%), the ship which initiated the communication contacted the medical department aboard another ship for assistance. As shown in Figure 7, this trend was particularly strong among combatant ships with independent duty corpsmen aboard. These corpsmen directed 70% of all medical communications to other ships rather than to shore facilities. Similarly, the corpsmen aboard amphibious ships contacted other ships in the majority (63%) of medical communications. Although the absence of SUBLANT data precluded submarines from Figure 7, Pacific Fleet submarines communicated with shore-based facilities in nine cases and with ships in six cases.

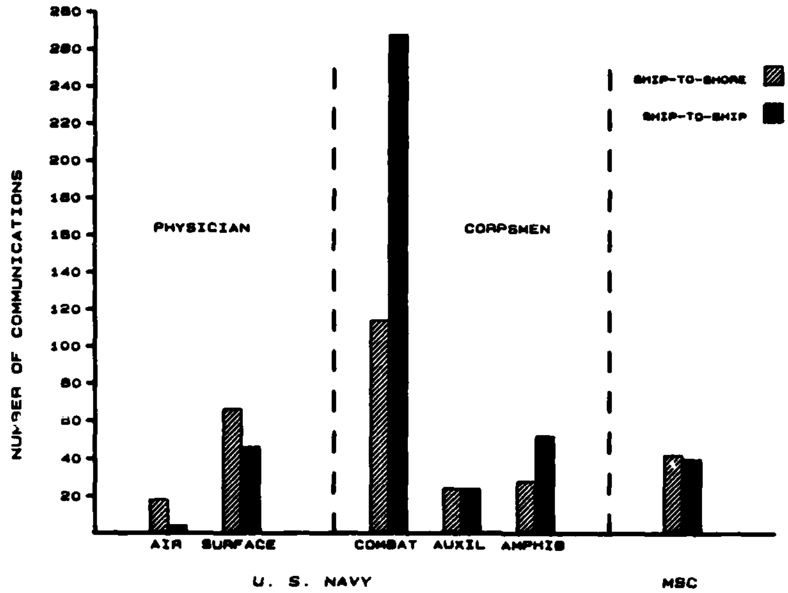

FIGURE 7. SHIP-TO-SHIP vs SHIP-TO-SHORE MEDICAL COMMUNICATIONS

Among the surface ships with a physician aboard, the combatants and auxiliaries contacted other *ships and shore facilities* with approximately equal frequency. The amphibious ships, however, contacted shore-based facilities in 65% of the communications. Although the physicians aboard aircraft carriers initiated relatively few medical communications, they contacted shore facilities almost exclusively (95%).

In the Military Sealift Command, ships with medical department personnel (i.e., corpsman, nurse, P.A.) aboard contacted other ships in 57% of their medical communications. Ships with a First Officer who served as the senior medical department representative, however, contacted other ships in only 35% of their medical communications. A list of the ship types and shore facilities which were contacted most frequently by both U.S. Navy and Military Sealift Command ships is presented in Table 5. The median distance of medical communications was ten miles.

TABLE 5

PRIMARY FACILITIES RECEIVING MEDICAL COMMUNICATIONS*

	N	%
SHORE		
Naval Hospital, San Diego, CA	37	3.5
Naval Hospital, Guantanamo, CU	33	3.1
Branch Dispensary, Naval Station, San Diego, CA	25	2.4
Naval Hospital, Subic Bay, RP	22	2.1
COMSCLANT, Bayonne, NJ	20	1.9
Naval Hospital, Pearl Harbor, HI	14	1.3
Naval Support Facility, Diego Garcia	12	1.1
Naval Hospital, Naples, IT	11	1.0
SHIP		
Aircraft Carrier (CV/CVN)	190	18.2
Amphibious Assault - Helo (LPH)	89	8.5
Amphibious Assault Ship (LHA)	16	1.6
Dock and Landing Ship (LPD)	16	1.5
Flagship (AGF)	13	1.2
Destroyer Tender (AD)	10	1.0
Battleship (BB)	10	1.0
Replenishment Oiler (AOR)	10	1.0

These facilities received 70% of all medical communications.

As shown in Figure 8, the primary modes of medical communication included radio telephone (39%) and message traffic (36%). While the majority of radio

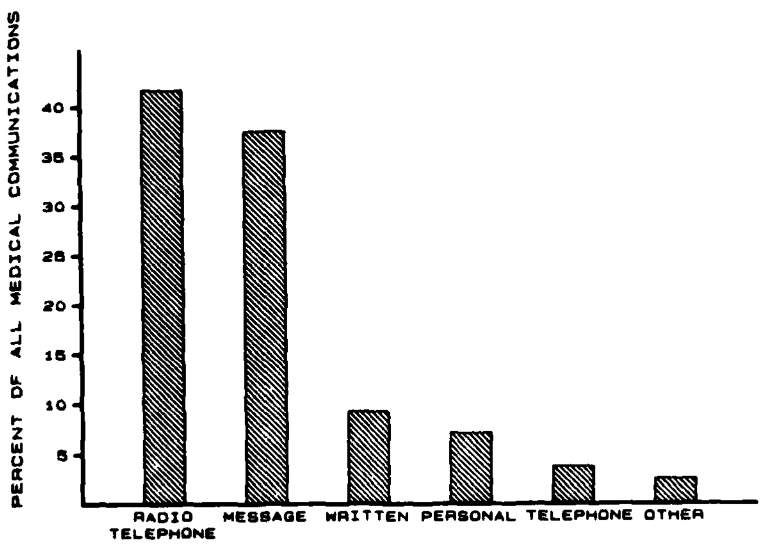

FIGURE 8. MODE OF MEDICAL COMMUNICATIONS AT SEA

telephone (77%) and message (62%) communications were directed to other ships, communications by mail were sent almost exclusively to shore facilities (93%).

In the majority of cases in which a medical communication occurred (62%), the patient was subsequently Medevaced off the ship. When the radio telephone was used as the mode of medical communication, 70% of the cases were evacuated. The probability of a Medevac following a medical communication did not differ significantly between physicians and independent duty corpsmen [$\chi^2(1) = 1.86$, $p > .05$] or between Atlantic and Pacific Fleets [$\chi^2(1) = 1.78$, $p > .05$].

The major diagnostic categories which were most frequently associated with medical communications included injuries, primarily fractures and lacerations; digestive system, primarily teeth and supporting structures; and ill-defined conditions, primarily abdominal or chest pain (Table 6). Within the five leading diagnostic categories, there was a significantly higher probability of a Medevac following a communication if the diagnosis was related to injury, digestive system, or mental problems [$\chi^2(4) = 25.4$, $p < .001$]. This difference was consistent for both physicians and independent duty corpsmen in both the Atlantic and Pacific Fleets.

TABLE 6

LEADING DIAGNOSES ASSOCIATED WITH COMMUNICATIONS*

DIAGNOSIS	PERCENT OF ALL COMMUNICATIONS
Injury (primarily fractures and lacerations)	31
Digestive (primarily teeth and supporting structures)	17
Ill-defined (primarily abdominal and chest)	10
Infectious Disease (primarily hepatitis)	8
Mental Disorders	6
Genitourinary	5
Nervous System and Sense Organs	5

Categories account for 82% of all medical communications.

Potential Value of Telecommunications. The perceived helpfulness of each medical communication was rated by the senior medical department representative on a 3-point scale with anchors labeled "No," "Somewhat," and "Yes." Although the medical communications were considered helpful (mean = 2.72), the ability to transmit medical data through telecommunications was viewed as a potentially positive adjunct. In 46% of the medical communications, the senior medical representative indicated that the communication would have been improved significantly if they had had the capability to transmit one or more of the types of medical data included in the Remote Medical Diagnosis System (i.e., X-ray, TV images of body part, ECG, Electronic Stethoscope, Lab Slides, Voice Communication from Sick Bay). Independent duty corpsmen identified a need for Remote Medical Diagnosis System capabilities significantly more frequently than physicians [$\underline{X}^2(1) = 35.5$, $\underline{p} < .001$).

Among the seven leading diagnoses associated with medical communications, the potential benefits of a Remote Medical Diagnosis System were most frequently associated with injuries (56%), genitourinary problems (51%), infectious diseases (49%), and ill-defined conditions (49%). The frequency with which potential benefits of the Remote Medical Diagnosis System were identified, however, was not significantly related to whether the patient was Medevaced or not [$\underline{X}^2(1) = 1.8$, $\underline{p} > .05$].

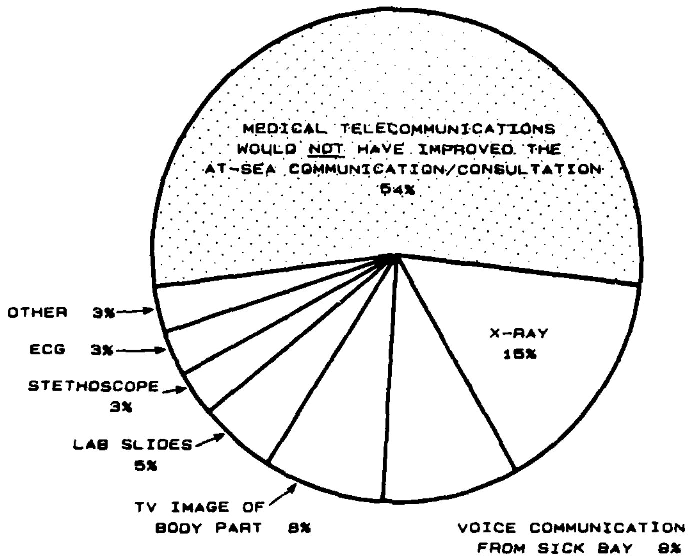

FIGURE 9. TELECOMMUNICATIONS RESOURCES WHICH WOULD HAVE SIGNIFICANTLY IMPROVED THE MEDICAL COMMUNICATION/CONSULTATION AT SEA

As shown in Figure 9, the ability to transmit X-ray images, voice communication from sick bay, and TV images of body part were the technologies most frequently identified to improve medical communications. The rank ordering of these telecommunications technologies was quite similar for physicians and independent duty corpmen and for Atlantic and Pacific Fleet ships. However, in 85% of the cases in which the senior medical representative identified the potential value of transmitting X-ray images, the ship did not have an X-ray capability on board. Therefore, these data may identify a perceived need for both X-ray equipment and the ability to transmit X-ray images.

Medevacs

For the purpose of this study, a Medevac was defined as the nonroutine transfer of a patient from a ship at sea for the purpose of receiving more definitive medical care. Analyses in the following section assess the frequency of Medevacs, the nature of Medevacs, and the potential value of shipboard medical telecommunications systems in preventing Medevacs.

Frequency of Medevacs. Frequency data on Medevacs are presented by ship type. These data provide an overview of the distribution of Medevacs throughout the fleet. Additional data regarding the rate of Medevacs per 1,000 patient visits provide an index of the relative frequency with which various health care providers Medevaced their patients.

During this 9-month study, a total of 743 Medevacs were reported from ships at sea (Atlantic Fleet = 357; Pacific Fleet = 386). In 517 cases, a Medevac Report Form was received, and in 225 cases the Medevac was reported on the Monthly Medical Communication Log but no Medevac Report Form was completed. Assuming that the number of Medevacs in the remaining three months of the year was similar to the average number of Medevacs observed during the nine months of the study, the annual number of Medevacs is estimated to be 991 (U.S. Navy = 927; Military Sealift Command = 64).

As shown in Figure 10, a large proportion of Medevacs were initiated from U.S. Navy combatant ships with an independent duty corpsman aboard. This distribution was primarily due to the large number of combatant ships in the population. Aircraft carriers had an average of 12 Medevacs per ship compared with an overall average of 1.65 Medevacs for other ships (Appendix E).* This

*It should be noted that extreme care was taken to insure that a Medevac which was received by an aircraft carrier from a smaller ship and transported to a final destination ashore was not documented as a Medevac from the aircraft carrier.

relatively large number of Medevacs from aircraft carriers was probably due to the extraordinary crew size and correspondingly large volume of patient visits which occurred aboard these ships.

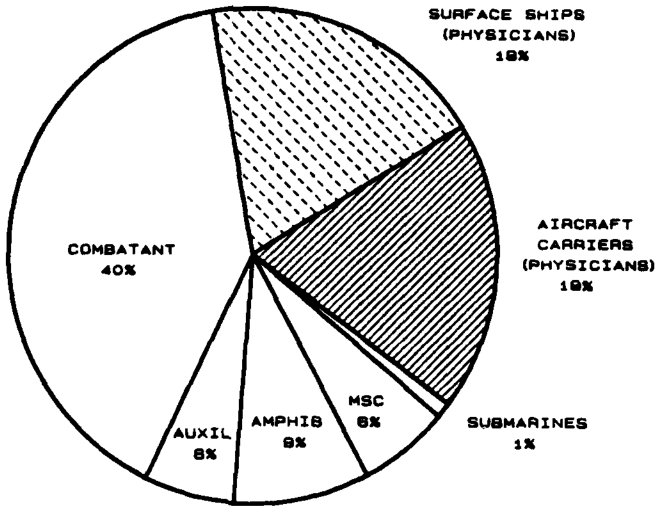

FIGURE 10. MEDEVACS BY SHIP TYPE (N = 743)

This position was supported by the fact that the rate of Medevacs per 1,000 patient visits aboard aircraft carriers was quite low (Figure 11). The rate of Medevacs per 1,000 patient visits was significantly higher among ships with an independent duty corpsman (mean 3.5) than among ships with a physician aboard (mean = 1.5) [$\underline{t}(331) = 4.2$, $\underline{p} < .001$]. This difference in Medevac rate between physicians and independent duty corpsmen was consistent in both the Atlantic and the Pacific Fleets. It is interesting to note that 80% of the Medevacs initiated by an independent duty corpsman were preceded with a medical communication while only 37% of the Medevacs initiated by a physician were preceded by a medical communication. There was no significant difference in the Medevac rate between the Atlantic Fleet (mean = 2.4 per 1,000 patient visits) and Pacific Fleet (mean 2.1 per 1,000 patient visits).

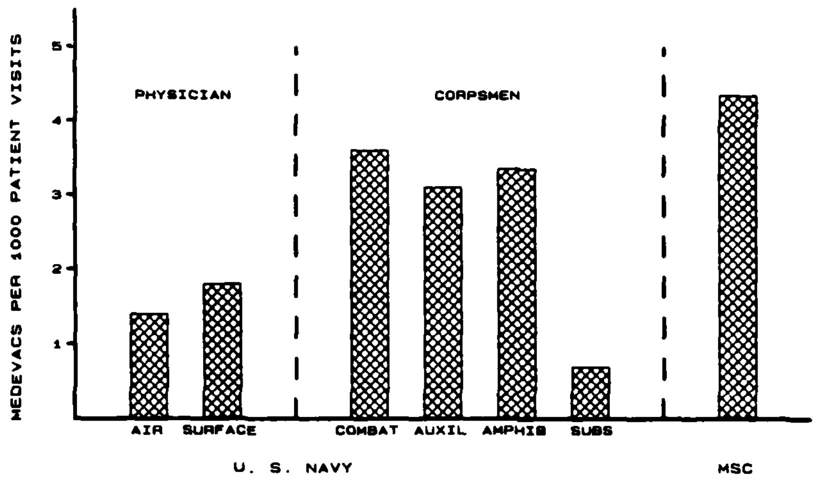

FIGURE 11. RATE OF MEDEVACS BY SHIP TYPE

Among the U.S. Navy surface ships with an independent duty corpsman aboard, the differences in Medevac rates between ship types was not significant in either the Atlantic or the Pacific Fleet. Likewise, the Medevac rate for senior medical department representatives who were chief petty officers was not significantly different from the rate for those senior medical medical department representatives who were not chief petty officers (i.e., E-5 and E-6). It is interesting to note that one of the lowest Medevac rates occurred among the submarines. As in the medical communications data, this relatively low rate is believed to be due, in large measure, to the resistance among submariners to disclose their position and thereby compromise their mission for nonemergency Medevacs. A complete listing of Medevac rate by ship type is presented in Appendix F.

Nature of Medevacs. In the majority of Medevacs (63%), the patient was transported to a shore-based facility for care. As shown in Figure 12, ships with a physician aboard generally Medevaced patients to shore-based facilities. This was particularly true for the aircraft carriers. The combatant ships with an independent duty corpsman aboard, on the other hand, more frequently Medevaced patients to larger ships. Pacific Fleet submarines Medevaced two patients to ships and three patients to shore-based facilities.

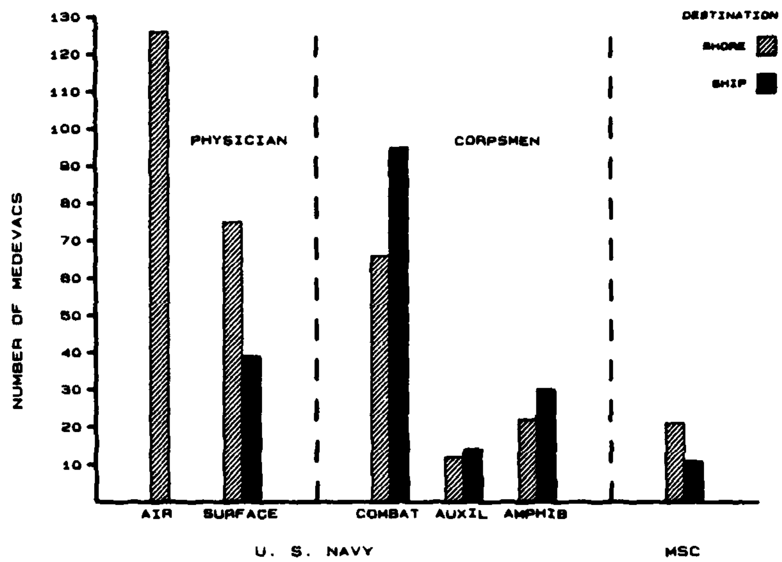

FIGURE 12. SHIP-TO-SHIP vs SHIP-TO-SHORE MEDEVACS

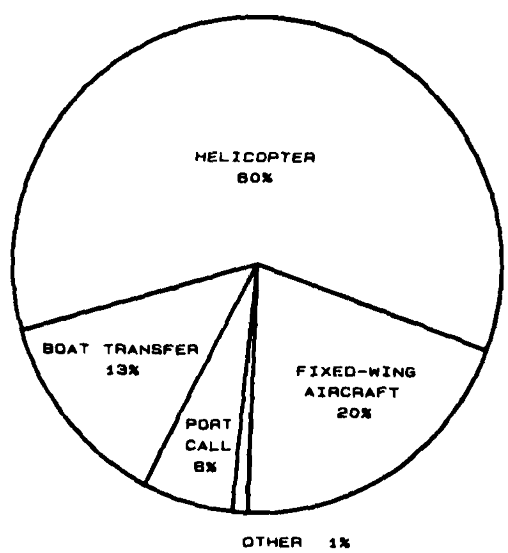

FIGURE 13. MODE OF MEDEVAC TRANSPORT

As shown in Figure 13, helicopters represented the primary mode of Medevac transport (60%). Small boat transfers were used in 13% of the Medevacs and were reported more frequently among amphibious ships and ships of the Military Sealift Command. Port calls were required in 6% of the Medevacs and were made more frequently by auxiliary ships and ships of the Military Sealift Command. Fixed wing aircraft were used to transport approximately 20% of the Medevacs. This figure, however, may represent a slight overestimation because ships which did not have fixed wing aircraft capabilities occasionally reported Medevacs by fixed wing aircraft. Approximately 9% of all Medevacs required a diversion of the ship. A general estimate of the transportation miles associated with each mode of Medevac is presented in Table 7.

TABLE 7

MEDEVAC MILES TO DESTINATION

TYPE OF TRANSPORT	COMPLETE DATA (N = 445)	ADJUSTMENT FOR MISSING DATA* (N = 743)	MEAN MILES	TOTAL MILES DURING STUDY** (9 mos.)	ESTIMATED TOTAL ANNUAL MILES
	N	N			
Boat	56	93	9.8	911	1,215
Helicopter	265	443	46.9	20,777	27,703
Fixed Wing Aircraft	98	164	865.3	141,909	189,212
Port Call	26	43	1278.1	54,958	73,277
Ship Diversions (excluding Port Calls)					11,668
Secondary Transfers (assume Fixed Wing Aircraft)					51,435
			TOTAL		*354,510*

**Medevac transport data was not available on 298 cases. Computation of adjusted N assumes consistent distribution of type of transport between observed and missing data.*

***Total miles = (Adjusted N) X (Mean Miles).*

Information regarding the general geographic location of the ship at the time of the Medevac was provided in 510 cases. Geographic locations were then categorized into the following regions: Western Pacific, Mid-Pacific, Northern Pacific, Southern Pacific (including Central and South America), CONUS Pacific, Gulf Coast, Caribbean, Southern Atlantic, CONUS Atlantic, Mid-Atlantic, Northern Atlantic (including Northern Europe), Spain, Mediterranean, Indian Ocean, and Australia. As shown in Figure 14, the majority of the Medevacs occurred in the Western Pacific, the Mediterranean, and in CONUS Pacific waters.

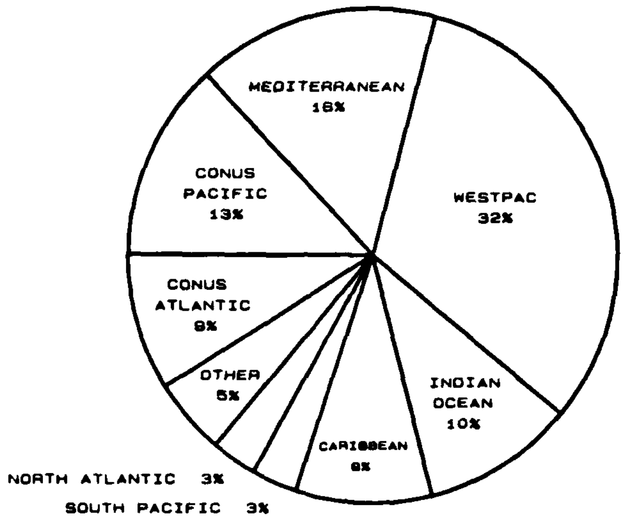

FIGURE 14. GEOGRAPHICAL DISTRIBUTION OF MEDEVACS

The primary shore-based and shipboard facilities which were designated as the final Medevac destinations are presented in Table 8. The eight shore facilities and five ship types presented in Table 8, received 70% of all Medevacs in which a final destination was reported (N = 517).

TABLE 8

PRIMARY FACILITIES RECEIVING MEDEVACS

	N	%
SHORE		
Naval Hospital, Yokosuka, Japan	37	12
Naval Hospital, Subic Bay, RP	37	12
Naval Hospital, San Diego, CA	36	12
Naval Hospital, Portsmouth, VA	23	8
Naval Hospital, Naples, IT	19	6
Naval Hospital, Roosevelt Roads, PR	17	6
Naval Hospital, Okinawa, Japan	15	5
USAF Regional Medical Center, Clark AFB, RP	11	4
SHIP		
Aircraft Carrier (CV/CVN)	89	50
Amphibious Assault - Helo (LPH)	56	32
Amphibious Assault Ship (LHA)	10	6
Replenishment Oiler (AOR)	5	3
Battleship (BB)	4	2

The principal diagnostic categories associated with Medevacs included injuries, primarily fractures and lacerations; and digestive problems, primarily teeth and supporting structures and suspected appendicitis (Table 9). In fact, nearly one-third of all Medevacs were caused by fractures (16%), lacerations (4%), noninjury-related dental problems (7%), or suspected appendicitis (5%). A complete listing of each Medevac diagnosis is presented in Appendix G.

TABLE 9

LEADING DIAGNOSES ASSOCIATED WITH MEDEVACS

DIAGNOSIS	PERCENT OF ALL MEDEVACS*
Injury (primarily fractures and lacerations)	36
Digestive (primarily teeth & supporting structures and appendicitis)	17
Ill-defined (primarily abdominal and chest pain)	8
Infectious Disease (primarily hepatitis)	8
Mental Disorders	7
Circulatory	5

**Categories account for 81% of all Medevacs.*

An inspection of the frequency of the six leading diagnostic categories associated with Medevacs (injury, digestive, infectious, ill-defined conditions, mental, and circulatory) in each of the six geographic regions of the world in which the majority of Medevacs occurred (WestPac, CONUSPac, Indian Ocean, Caribbean, Mediterranean, and CONUSLant) revealed a greater than expected incidence of Medevacs for infectious disease (i.e., hepatitis) in the Western Pacific (expected value = 18.5, observed = 32). It is also interesting to note that the number of injury-related Medevacs was slightly higher than expected in the Caribbean (expected value = 16.6, observed = 24) and somewhat lower than expected in the Indian Ocean (expected value = 15.7, observed = 9).

Although the leading diagnostic categories associated with Medevacs were generally quite similar for physicians and independent duty corpsmen, there was a slight tendency for physicians to initiate proportionally more Medevacs for infectious diseases and fewer Medevacs for ill-defined conditions than independent duty corpsmen. This finding was primarily due to a number of hepatitis-related Medevacs from an aircraft carrier in the Western Pacific.

Follow-up information from the final Medevac destination was obtained in 261 cases, or 50% of the cases in which a Medevac Report Form was received from the ship which initiated the Medevac. In 79 cases, the bottom half of the Medevac Report Form was completed by the receiving facility and forwarded to the Naval Health Research Center. In the majority of instances (N = 182), however, retrospective information was obtained by writing to the designated final Medevac destinations on a case-by-case basis to request a follow-up on the Medevac.

In the majority of Medevacs initiated by either physicians or independent duty corpsmen (62%), the initial shipboard diagnosis was identical with the final diagnosis of the receiving facility. In 16% of the cases, there were only slight differences in the shipboard and shore-based diagnosis (e.g., affective psychosis vs. other psychosis; abdominal pain, diarrhea vs. intestinal diseases of viral or unknown origin; tonsillitis, acute vs. URTI, acute; bleeding per rectum, gastrointestinal bleeding vs. peptic ulcer). In the remaining 22% of the cases, the discrepancies between the shipboard and the shore-based diagnosis were more substantial (e.g., fracture/dislocation vs. bruise, contusion with intact skin surface; appendicitis vs. abdominal pain or disease-intestinal, URI; nonspecific diagnosis or symptom vs. specified disorder of the same organ/system). A complete list of shipboard and shore-based diagnotic discrepancies is presented in Appendix

TABLE 10

MEDEVAC DISPOSITION AT RECEIVING FACILITY

DISPOSITION	SHORE FACILITY N	SHORE FACILITY %	SHIPBOARD FACILITY N	SHIPBOARD FACILITY %
Release for duty following treatment/evaluation	32	21	33	25
Return to sender with treatment specifications	10	7	43	32
Hold for treatment/evaluation	51	34	21	16
Transfer to another medical facility	52	35	34	26
Death	4	3	1	1
TOTAL	*149*	*100*	*132*	*100*

At the receiving facilities, Medevac cases were either transferred (33%), held for treatment (25%), released for duty following treatment/evaluation (23%), or returned to duty with treatment specifications (18%). The primary difference in the Medevac dispositions of shipboard and shore-based receiving facilities was that shipboard facilities were somewhat more likely to return the patient with treatment specifications and shore-based facilities were more likely to hold the patient for treatment or transfer the patient (Table 10). Overall, there were no adverse effects to patients attributed to the Medevac process, and 13 Medevacs (5%) were identified as unnecessary.

During the course of the study, five fatalities were documented subsequent to a Medevac. These included a Myocardial Infarction aboard an FF, a case of Heart Failure aboard a T-AO, and three burn cases aboard a CV, a DDG, and an FFG.

Potential Value of Telecommunications. In 28% of all Medevacs, the senior medical department representative indicated that there was a significant probability that the Medevac could have been prevented if he had had the capability to transmit one or more of the types of medical data included in the Remote Medical Diagnosis System. On a case-by-case basis, independent duty corpsmen indicated that 44% of all Medevacs probably could have been prevented with one or more of the medical telecommunications technologies included in the Remote Medical Diagnosis System presented in the Medevac Report Form. Physicians, on the other hand, indicated that only 10% of their Medevacs probably could have been prevented with medical telecommunications technologies included in the Remote Medical Diagnosis System.

Among the six leading diagnostic categories associated with Medevacs, the benefits of a Remote Medical Diagnosis System were most frequently associated with injuries (expected value = 53, observed = 71) and least frequently associated with mental problems (expected value = 11.2, observed = 3) and infectious diseases (expected value = 14.7, observed = 5). The relatively low frequency with which medical telecommunications were identified as a positive adjunct in infectious disease cases was largely because physicians Medevaced a somewhat higher proportion of infectious disease cases and were much less likely to indicate that the Medevac probably could have been prevented with medical telecommunications technology.

As shown in Figure 15, the ability to transmit X-ray images and TV images of body part were the technologies most frequently identified as having a significant probability of preventing Medevacs. The rank ordering of these technologies was quite similar in both the Atlantic and Pacific Fleets. However, in 91% of the cases in which the senior medical department representative identified the potential value of transmitting X-ray images, the ship did not have an X-ray capability on board. Therefore, these data, like the medical communication data, identify a perceived need for both X-ray equipment and the ability to transmit X-ray images.

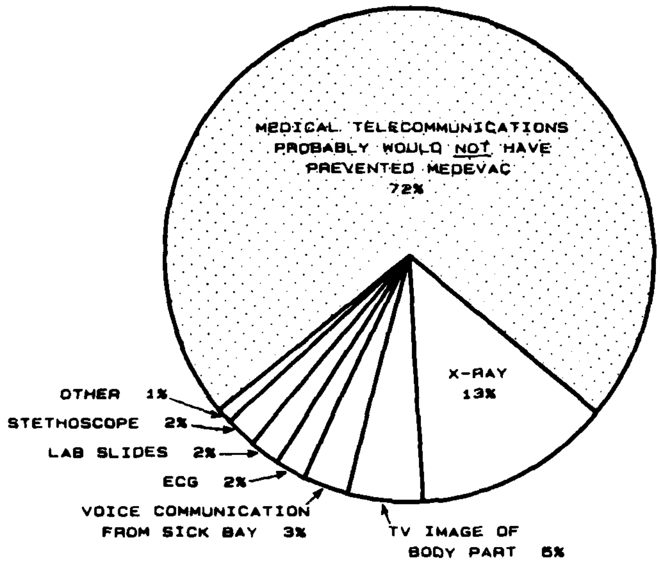

FIGURE 15. MEDEVACS WHICH PROBABLY COULD HAVE BEEN PREVENTED WITH MEDICAL TELECOMMUNICATIONS EQUIPMENT

Information regarding the potential value of medical telecommunications equipment in preventing Medevacs was also obtained on a case-by-case basis from the facility which received the Medevac. As reported earlier, 79 Medevac Follow-up Reports were submitted from receiving facilities, and retrospective mail follow-up provided information on an additional 182 cases. In those cases in which the Follow-up Medevac Report was submitted by the receiving facility, the attending medical personnel indicated that 21.5% of the Medevacs probably could have been prevented if the initiating ship had had the capability to transmit one or more of the types of data included in the Remote Medical Diagnosis System. This figure compares quite closely with the 28% identified by the medical department personnel aboard the initiating ships.

Results from those receiving facilities which provided retrospective data in response to follow-up inquiries mailed from the Naval Health Research Center, however, indicated that only 10.4% of the Medevacs probably could have been prevented with medical telecommunications capabilities. These data, however, are somewhat suspect because they were retrospective, were frequently obtained by a records clerk, and were at considerable variance with the estimates provided by medical personnel aboard the initiating ships and medical personnel on duty at receiving facilities at the time of the Medevacs. Therefore, the 21.5% estimate obtained from the subset of receiving facilities which spontaneously forwarded the Follow-up Medevac Reports was considered the more accurate receiving facility estimate of the percentage of Medevacs which could probably be prevented with medical telecommunications equipment.

DISCUSSION

The primary mission of the U.S. Navy Medical Department is combat readiness and support of the operating forces.[14] Therefore, the process of health care delivery afloat represents a principal component of Navy medical policy and provides a fundamental interface betw en Navy medical personnel and the operating forces. Given the specialized nature and critical importance of shipboard medical departments, the purpose of the present study was to: (1) provide a descriptive overview of medical department staffing and operational factors associated with patient visit rates, (2) document the frequency and nature of medical communications and evacuations, and (3) determine the potential need for telemedicine capabilities aboard ship.

The shipboard medical departments were clustered into three general groups which included (1) aircraft carriers with a number of physicians and relatively large medical and dental staffs and equipment, (2) large surface ships with a physician and moderately sized staff and equipment, and (3) smaller surface ships with an independent duty corpsman, a junior corpsman, and very little technical equipment. Although only 23% of the ships had a physician aboard, these ships accounted for 60% of the total U.S. Navy man-days at sea and 57% of the total patient visits at sea. This relatively large proportion of man-days at sea and corresponding patient visits was due to the fact that physicians are assigned to ships with very large crews. Interestingly, however, the potential work load, as indexed by the crew-to-medical staff ratio, was greater aboard the smaller ships with an independent duty corpsman aboard. For example, the average crew-to-medical staff ratio for a small ship with an independent duty corpsman aboard was nearly double the average ratio for a larger surface ship with a physician aboard.

The average rate of patient visits for all ships over the entire study period was 18 visits per 1,000 man-days at sea. In other words, approximately 1.8% of the ship's crew can be expected to visit sick bay on an average day at sea. In general, the patient visit rate was somewhat elevated during the first few days of an at-sea period and became fairly stable after the fourth day at sea. The shape of the patient visit rate curve presented in Figure 3 is often indicative of an adaptation or habituation process. Although information regarding the presenting problems was not available, many of these visits during the first few days at sea may have been precipitated by the transition from a stable platform ashore to a dynamic environment afloat. The flattening of the patient visit rate curve after the fourth day at sea could possibly signal the completion of an environmental adaptation process which Reason and Brand[15] refer to as "protective adaptation." A prolonged exposure to any one type of nauseogenic stimulus leads to a diminution and eventual disappearance of the signs and symptoms in most people.

The rate of this "protective adaptation" to the rearranged vestibular inputs experienced in sea travel is somewhat variable, but Groen[16] has concluded that three days is the adjustment period for the normal passenger. While this "protective adaptation" hypothesis represents only one of a number of alternative explanations, it does appear that patient visit rates for the broad majority of at-sea periods were more affected by the period of transition from shore to sea than by the cumulative effect of days at sea.

The patient visit rate at sea also varied with the day of the week. The number of patient visits generally decreased from Monday through Saturday and dropped dramatically on Sunday. The low number of patient visits on Sunday was probably associated with the more relaxed work load for the crew (i.e., fewer injuries) and more limited access to medical personnel (i.e., shortened sick call hours and attention given only to acute or nonroutine cases).

A multiple regression analysis also revealed that ships with larger crew-to-medical staff ratios and ships in the Atlantic Fleet had somewhat lower patient visit rates than ships with smaller crew-to-staff ratios and ships in the Pacific Fleet. The negative relationship between patient visit rate and crew-to-staff ratio may reflect a decrease in utilization behavior as access to medical department resources becomes more limited. The difference in patient visit rates between the Atlantic and Pacific fleets is more difficult to explain. In a previous study[17] of 20 combat ships during overseas deployment, a higher incidence of VD and genitourinary (GU) illness was reported among Pacific Fleet ships. While this difference in VD/GU illness incidence among ships deployed in the Pacific and Atlantic fleets could help explain between-fleet differences for deployed ships, it does not explain that same between-fleet difference observed for nondeployed ships.

Although the Atlantic and Pacific Fleet differences in patient visit rate were consistent across various ship types, the magnitude of the difference was relatively small. The combined effect of fleet and crew-to-medical staff ratio accounted for only 8% of the variance in patient visit rate. Other variables, such as the presence of a physician aboard, deployment status, ship type, and total days at sea during the study period, had no appreciable effect on patient visit rate. While a detailed examination of health care utilization at sea was clearly beyond the scope of this study, the results suggest that operational or situational factors, such as crew-to-medical staff ratio, fleet, day of the week, and initial period underway, may be used in combination with previously identified environmental[18] and sociodemographic[19] factors to better understand the process of health care utilization at sea.

During in-port periods, Pacific Fleet ships provided patient visit and referral data. Approximately 11% of the 110,758 in-port patient visits which occurred during the 9-month period were referred off the ship for treatment or consultation. This referral rate compares quite closely with an 11% patient referral rate documented by this Center in a study of 2,547 outpatient visits to shore-based clinics.[20] In the present study, independent duty corpsmen referred about 18% of their patients, and these referrals were about evenly distributed between specialty clinics and general medical referrals. Physicians, on the other hand, referred approximately 7% of their patients, and the majority of these referrals (90%) were to specialty clinics. Overall, about two-thirds of all referrals involved specialty clinics. The specialty clinics most frequently consulted by shipboard medical personnel included orthopedics, ENT, dermatology, and dental. These specialty consultations correspond quite closely with the types of medical problems most frequently observed in shipboard settings.[21] The leading general medical referrals included respiratory, alcohol/drug, and musculoskeletal problems.

During the course of the study, shipboard medical department personnel initiated 753 medical communications to request assistance in the diagnosis, treatment, or other clinical management of their patients. Based on these data, the average U.S. Navy ship can be expected to initiate approximately two medical communications per year. This level of communication indicates that shipboard medical department personnel initiate requests for assistance on a very infrequent basis. When medical communications were initiated, medical personnel typically used the radio telephone or a message. While the majority of the communications were directed to other ships, the locus of the communications contact appeared to be a function of the level of training of the medical department representative and the ship's proximity to a ship with a physician aboard. Combatant ships with independent duty corpsmen aboard, for example, often provide tactical support for larger ships with physicians aboard and rely primarily on these ships, such as aircraft carriers and amphibious assault-helo ships, for medical advice. Military Sealift Command ships, on the other hand, often steam independently, and contact other ships and shore facilities with equal frequency. Ships with a physician aboard tend to contact shore-based facilities.

The rate of medical communications also appeared to be affected by the level of training of the senior medical department representative. Independent duty corpsmen aboard surface ships, for example, initiated six times as many medical communications per 1,000 patient visits as physicians aboard ship. The fact that the medical communications rate from ships with a single physician aboard was double the rate from aircraft carriers with a number of physicians aboard indicates that the need for professional corroboration or collaboration may also play a role in medical communications.

The medical communication rate also appears to be influenced by the overall communications doctrine of the ship. The generally low rate of medical communications observed among Pacific Fleet submarines was probably due to the more stringent electronic emission control standards placed upon submarines. Across all ships in the study, the average medical communication rate was 2.4 per 1,000 patient visits. In other words, approximately two-tenths of one percent of all patient visits required a medical communication.

In the majority of cases in which a medical communication occurred (62%), the patient was Medevaced off the ship. This association indicates that medical communications are generally reserved for more serious cases. The probability of a Medevac following a medical communication did not differ substantially between physicians and independent duty corpsmen. However, given the occurrence of a Medevac, an independent duty corpsman was far more likely to have initiated a communication prior to the Medevac (80%) than a physician (37%). While many of these Medevac-related communications were probably initiated to facilitate the Medevac decision process, others may have been initiated to assist the corpsman in stabilizing the patient or in preparing him for the Medevac.

The major diagnostic categories which were most frequently associated with medical communications included: injuries, primarily fractures and lacerations; digestive problems, primarily teeth and supporting structures; and ill-defined conditions, primarily abdominal or chest pain. Injuries and digestive problems constituted the most salient diagnostic categories because they accounted for almost one-half of all medical communications and were more likely to be followed with a Medevac.

Although shipboard medical department representatives generally considered medical communications to be helpful, they indicated that 46% of the communications would have been improved significantly if they had had the capability to transmit one or more of the types of medical data included in the Remote Medical Diagnosis System. The transmission capabilities most frequently identified included X-ray images, voice communications from sick bay, and TV image of body part. While the transmission of X-ray images was viewed as a potentially positive adjunct in the diagnosis and treatment of shipboard medical problems, the majority of ships do not have an X-ray machine. Therefore, these data identify a perceived need for both X-ray equipment and the ability to transmit X-ray images.

During this 9-month study, a total of 743 Medevacs were reported from ships at sea. Based on these data, the annual number of Medevacs is estimated to be 991 or approximately two Medevacs per ship per year. Although aircraft carriers reported more Medevacs per ship than any other ship type, the higher incidence was probably due to the extremely large crew size and correspondingly large number of patient visits. The 12 aircraft carriers in the study, for example, accounted for 32% of all patient visits but initiated only 19% of all Medevacs.

In fact, the average Medevac rate for all ships with a physician aboard (1.5 Medevacs per 1,000 patient visits) was less than one-half the rate experienced by ships with an independent duty corpsman aboard (3.5 Medevacs per 1,000 patient visits). The lower Medevac rate aboard ships with physicians was probably due to the more advanced levels of medical decision-making and treatment skills among physicians, and the availability of more sophisticated medical equipment. The generally lower Medevac rate among submarines with an independent duty corpsman aboard indicated that mission security may also play a central role in nonemergency Medevacs. This security issue, of course, would become a much greater determinant of the Medevac criteria process during periods of hostility.

Less than one-third of the Medevacs documented in this study occurred within geographic proximity to the continental United States (i.e., CONUSPac, CONUSLant, Caribbean). This was a particularly interesting finding because the majority of Medevacs (63%) were transported to shore-based facilities for more definitive medical care. These data indicate that U.S. Navy hospitals worldwide play an important support role for the fleet. Overseas U.S. Navy hospitals in Japan, the Philippines, and Italy were particularly well utilized as receiving facilities for Medevacs. While larger ships with a physician aboard tended to Medevac patients to shore-based facilities, many of the smaller ships, particularly combatants, Medevaced a majority of patients to other ships with a physician aboard. Aircraft carriers and amphibious assault-helo ships received the great majority of these ship-to-ship Medevacs.

Most Medevac cases were transported by helicopter, but the majority of Medevac miles were logged by fixed wing aircraft. During a one-year period, it was estimated that approximately 350,000 miles would be traveled by aircraft, ships, and boats to transport U.S. Navy Medevac patients. Although this estimate is very imprecise, it does provide an additional perspective on the Medevac process.

Throughout the course of the study, injuries were the predominant factor in precipitating Medevacs. Because many of these injuries involved a suspected fracture, the independent duty corpsman aboard ship frequently identified the potential need for transmitting X-ray images during a remote telecommunications consultation. An inspection of the discrepancies between the Medevac diagnoses and the receiving facility diagnoses also revealed that suspected fractures often received a final diagnosis of crushing injury with contusion. These results indicate that injuries represent a prevalent form of shipboard medical emergency and that independent duty corpsmen could benefit from greater support in the diagnoses of fractures.

Problems associated with the digestive system were the second leading cause of Medevacs. Interestingly, about 40% of the Medevacs for digestive system problems involved diseases of the teeth and supporting structures. These noninjury-related dental problems consisted primarily of abscesses/infections, but problems with wisdom teeth and dental caries were also well represented. The fact that noninjury-related dental problems accounted for 7% of all U.S. Navy Medevacs may have implications for the Navy's preventive dentistry program or for training independent duty corpsmen in the treatment of acute dental problems.

Appendicitis represented another digestive problem which was difficult to diagnose and which frequently resulted in a Medevac. Although a computer-assisted clinical algorithm system which focuses on acute abdominal pain has been implemented aboard submarines, the potential of this approach has not been evaluated aboard surface ships.

On a case-by-case basis, the senior medical department representatives indicated that there was a significant probability that 28% of all Medevacs could have been prevented by advanced medical telecommunications technologies. This endorsement came largely from independent duty corpsmen and centered on injury-related diagnostic adjuncts such as X-ray, voice communication from s: < bay, and TV images of body part.

While both medical telecommunications technologies and clinical algorithms may provide useful tools for shipboard medical department personnel, understanding the process of clinical reasoning may represent the key to improving medical decision-making. In a review of the psychology of clinical reasoning, Elstein and Bordage[22] discussed assessments of clinical reasoning within the paradigms of information processing, judgment, and decision theory. Based on extant literature, these authors concluded that clinical reasoning is a highly flexible process which is more error-prone and less perfect than they had hoped. Realizing that subjective probabilities are often biased or erroneous, Elstein and Bordage encourage more documentation to build up bases of statistical data from which the frequencies of various events can be estimated more accurately. Within the present context, the continued systematic documentation of Medevac cases could lead to better decision-making guidelines and enhanced medical department support.

The present study represents an initial attempt to document salient issues in the Medevac process. While these results provide only an approximation of Medevac-related behaviors over time, the large sample size, the high degree of compliance, and the overall consistency of the findings across ship types and between fleets lends confidence to the data, implies stability, and encourages generalization. Therefore, this study is viewed as an important point of departure toward a more complete understanding of shipboard health care delivery and medical decision-making.

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APPENDICES A THROUGH H

APPENDIX A

Distribution of Sample by Type Command and Ship Type

Surface Ships	Pacific (N = 173)	Atlantic (N = 181)
Aircraft Carriers		
AVT	0	1
CV	4	4
CVN	1	2
Combatants		
BB	1	0
CG	11	8
CGN	3	6
DD	16	21
DDG	15	23
FF	30	29
FFG	9	15
Auxiliaries		
AD	4	4
AE	7	5
AFS	4	3
AGDS	1	0
AGF	0	1
AGSS	1	-
AO	1	4
AOE	2	2
AOR	4	3
AR	3	1
ARS	3	4
AS	3	-
ASR	2	-
ATF	3	2
ATS	2	1
AVM	1	0
Amphibious		
LCC	1	1
LHA	3	2
LKA	3	2
LPD	7	6
LPH	3	4
LSD	6	5
LST	10	10
MSO*	9	12

Submarines	Pacific (N = 42)	Atlantic
SS	3	-
SSAG	1	-
SSBN	5	-
SSN	33	-

Military Sealift Command

	Pacific (N = 30)	Atlantic (N = 24)
T-AE	1	0
T-AFS	1	1
T-AG	0	2
T-AGM	1	2
T-AGOR	2	2
T-AGS	4	5
T-AK	3	1
T-AKR	3	1
T-AO	7	5
T-AOG	3	0
T-ARC	1	2
T-ATF	4	3

*Although MSOs are not amphibious ships, they were included in this group because they are relatively small and often operate in coastal waters.

APPENDIX B

SHIPBOARD MEDICAL DEPARTMENT STAFFING AND EQUIPMENT

AIRCRAFT CARRIERS	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
CONVENTIONAL																		
USS LEXINGTON (AVT-16)	0	1	0	1	0	0	0	1	1	2	4	6	Y	Y	Y	Y	Y	Y
USS MIDWAY (CV-41)	1	0	3	1	1	1	1	1	1	4	11	14	Y	Y	Y	Y	Y	Y
USS CORAL SEA (CV-43)	0	1	1	1	1	0	1	1	1	5	6	10	Y	Y	Y	Y	Y	Y
USS SARATOGA (CV-60)	0	0	1	1	1	0	1	1	0	3	7	4	Y	Y	Y	Y	Y	Y
USS RANGER (CV-61)	0	1	1	1	1	0	0	1	2	4	4	12	Y	Y	Y	Y	Y	Y
USS INDEPENDENCE (CV-62)	0	1	0	4	1	1	1	1	3	6	10	10	Y	Y	Y	Y	Y	Y
USS KITTY HAWK (CV-63)	0	0	1	1	1	0	1	1	1	1	5	6	Y	Y	Y	Y	Y	Y
USS AMERICA (CV-66)	0	1	0	3	1	1	1	1	2	7	5	25	Y	Y	Y	Y	Y	Y
USS JOHN F. KENNEDY (CV-67)	0	0	2	3	1	1	1	0	2	5	0	18	Y	Y	Y	Y	Y	Y
NUCLEAR																		
USS ENTERPRISE (CVN-65)	2	1	0	1	1	0	2	2	2	2	5	21	Y	Y	Y	Y	Y	Y
USS NIMITZ (CVN-68)	2	0	0	1	1	0	1	1	2	3	3	17	Y	Y	Y	Y	Y	Y
USS DWIGHT D. EISENHOWER (CVN-69)	1	0	1	3	1	0	1	2	1	4	9	25	Y	Y	Y	Y	Y	Y

COMBATANTS	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
BATTLESHIP																		
USS NEW JERSEY (BB-62)	0	0	1	0	0	0	0	1	3	1	4	6	Y	Y	Y	Y	Y	Y
GUIDED MISSILE CRUISER																		
USS LEAHY (CG-16)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	Y	N
USS HARRY E. YARNELL (CG-17)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS WORDEN (CG-18)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS DALE (CG-19)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS RICHMOND K. TURNER (CG-20)	0	0	0	0	0	0	0	1	0	0	0	1	N	N	N	N	N	N
USS GRIDLEY (CG-21)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS ENGLAND (CG-22)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	Y	N	N
USS HALSEY (CG-23)	0	0	0	0	0	0	0	0	1	0	0	2	N	N	N	N	N	N
USS REEVES (CG-24)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS BELKNAP (CG-26)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS JOSEPHUS DANIELS (CG-27)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS WAINWRIGHT (CG-28)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS JOUETT (CG-29)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS HORNE (CG-30)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	Y	N	N	N
USS STERETT (CG-31)	0	0	0	0	0	0	0	0	1	0	1	1	N	N	N	N	N	N
USS WILLIAM H. STANDLEY (CG-32)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS FOX (CG-33)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS BIDDLE (CG-34)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS TICONDEROGA (CG-47)	0	0	0	0	0	0	0	0	0	1	0	1	Y	N	N	N	N	N
GUIDED MISSILE CRUISER-NUCLEAR																		
USS BAINBRIDGE (CGN-25)	0	0	0	1	0	0	0	0	0	2	0	0	Y	Y	Y	Y	N	N
USS TRUXTUN (CGN-35)	0	0	0	0	0	0	0	0	2	0	0	2	Y	N	Y	N	N	N
USS CALIFORNIA (CGN-36)	0	0	0	1	0	0	0	0	1	1	1	0	Y	Y	Y	Y	Y	N
USS SOUTH CAROLINA (CGN-37)	0	0	0	1	0	0	0	0	1	1	2	1	Y	Y	Y	Y	N	N
USS VIRGINIA (CGN-38)	0	0	0	1	0	0	0	0	1	1	2	0	Y	Y	Y	Y	N	N
USS TEXAS (CGN-39)	0	0	1	0	0	0	0	0	1	1	1	0	Y	Y	Y	Y	N	N
USS MISSISSIPPI (CGN-40)	0	0	0	1	0	0	0	0	0	3	0	2	Y	Y	Y	Y	N	N
USS ARKANSAS (CGN-41)	0	0	1	0	0	0	0	0	3	0	0	2	Y	Y	Y	Y	N	N
USS LONG BEACH (CGN-9)	0	0	0	1	0	0	0	1	0	2	2	6	Y	Y	Y	Y	Y	Y
DESTROYER																		
USS WILLIAM C. LAWE (DD-763)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS HAROLD J. ELLISON (DD-864)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS MANLEY (DD-940)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS DUPONT (DD-941)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N

COMBATANTS	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
DESTROYER																		
USS MULLINNIX (DD-944)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS HULL (DD-945)	0	0	0	0	0	0	0	0	1	0	1	1	N	N	N	N	N	N
USS EDSON (DD-946)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS SPRUANCE (DD-963)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS PAUL F. FOSTER (DD-964)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS KINKAID (DD-965)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS HEWITT (DD-966)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS ELLIOT (DD-967)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS ARTHUR W. RADFORD (DD-968)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS PETERSON (DD-969)	0	0	0	0	0	0	0	1	0	0	0	1	N	N	N	N	N	N
USS CARON (DD-970)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS DAVID R. RAY (DD-971)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS OLDENDORF (DD-972)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS JOHN YOUNG (DD-973)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS COMTE DE GRASSE (DD-974)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS O'BRIEN (DD-975)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS MERRILL (DD-976)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	Y	N
USS BRISCOE (DD-977)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS STUMP (DD-978)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS CONOLLY (DD-979)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS MOOSBRUGGER (DD-980)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS JOHN HANCOCK (DD-981)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS NICHOLSON (DD-982)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS JOHN RODGERS (DD-983)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS LEFTWICH (DD-984)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS CUSHING (DD-985)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS HARRY W. HILL (DD-986)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS O'BANNON (DD-987)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS THORN (DD-988)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS DEYO (DD-989)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS INGERSOLL (DD-990)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS FIFE (DD-991)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS FLETCHER (DD-992)	0	0	0	0	0	0	0	0	0	1	0	1	N	Y	N	N	N	N
GUIDED MISSILE DESTROYER																		
USS SAMPSON (DDG-10)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS SELLERS (DDG-11)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS ROBISON (DDG-12)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS HOEL (DDG-13)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS BUCHANAN (DDG-14)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS BERKELEY (DDG-15)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS JOSEPH STRAUSS (DDG-16)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS CONYNGHAM (DDG-17)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N

COMBATANTS

	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
GUIDED MISSILE DESTROYER																		
USS SEMMES (DDG-18)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS TATTNALL (DDG-19)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS CHARLES F. ADAMS (DDG-2)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	Y	N
USS GOLDSBOROUGH (DDG-20)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS COCHRANE (DDG-21)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS BENJAMIN STODDERT (DDG-22)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS RICHARD E. BYRD (DDG-23)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS WADDELL (DDG-24)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	Y	N	N	N
USS JOHN KING (DDG-3)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS DECATUR (DDG-31)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS FARRAGUT (DDG-37)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS LUCE (DDG-38)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS MACDONOUGH (DDG-39)	0	0	0	0	0	0	0	0	0	2	0	1	N	N	N	N	Y	N
USS LAWRENCE (DDG-4)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS COONTZ (DDG-40)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS KING (DDG-41)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS MAHAN (DDG-42)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS DAHLGREN (DDG-43)	0	0	0	0	0	0	0	0	1	0	0	1	N	Y	N	N	N	N
USS WILLIAM V. PRATT (DDG-44)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS DEWEY (DDG-45)	0	0	0	0	0	0	0	0	0	1	0	2	N	N	N	N	N	N
USS PREBLE (DDG-46)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS CLAUDE V. RICKETTS (DDG-5)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS BARNEY (DDG-6)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS HENRY B. WILSON (DDG-7)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS LYNDE MCCORMICK (DDG-8)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS TOWERS (DDG-9)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS KIDD (DDG-993)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS CALLAGHAN (DDG-994)	0	0	0	0	0	0	0	1	0	0	1	0	N	N	N	N	N	N
USS CHANDLER (DDG-996)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS SCOTT (DDG-995)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
FRIGATE																		
USS BRONSTEIN (FF-1037)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS MCCLOY (FF-1038)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS GARCIA (FF-1040)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS BRADLEY (FF-1041)	0	0	0	0	0	0	0	1	0	0	0	1	N	N	N	N	N	N
USS EDWARD MCDONNELL (FF-1043)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS BRUMBY (FF-1044)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	Y	N	N	N
USS DAVIDSON (FF-1045)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS VOGE (FF-1047)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS SAMPLE (FF-1048)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS KOELSCH (FF-1049)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS ALBERT DAVID (FF-1050)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N

COMBATANTS

	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
FRIGATE																		
USS O CALLAHAN (FF-1051)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS KNOX (FF-1052)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS ROARK (FF-1053)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS GRAY (FF-1054)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS HEPBURN (FF-1055)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS CONNOLE (FF-1056)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	Y	N	N
USS RATHBURNE (FF-1057)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS MEYERKORD (FF-1058)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	Y	N
USS W. S. SIMS (FF-1059)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS LANG (FF-1060)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS PATTERSON (FF-1061)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS WHIPPLE (FF-1062)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS REASONER (FF-1063)	0	0	0	0	0	0	0	1	0	0	1	0	N	N	N	N	N	N
USS LOCKWOOD (FF-1064)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS STEIN (FF-1065)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS MARVIN SHIELDS (FF-1066)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS FRANCIS HAMMOND (FF-1067)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS VREELAND (FF-1068)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS BAGLEY (FF-1069)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS DOWNES (FF-1070)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS BADGER (FF-1071)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS BLAKELY (FF-1072)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS ROBERT E. PEARY (FF-1073)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS HAROLD E. HOLT (FF-1074)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS TRIPPE (FF-1075)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS FANNING (FF-1076)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS OUELLET (FF-1077)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS JOSEPH HEWES (FF-1078)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS BOWEN (FF-1079)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS PAUL (FF-1080)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS AYLWIN (FF-1081)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	Y	N
USS ELMER MONTGOMERY (FF-1082)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS COOK (FF-1083)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS MCCANDLESS (FF-1084)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS DONALD B. BEARY (FF-1085)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS BREWTON (FF-1086)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS KIRK (FF-1087)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS BARBEY (FF-1088)	[illegible]	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS JESSE L. BROWN (FF-1089)		0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS AINSWORTH (FF-1090)		0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS MILLER (FF-1091)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS THOMAS C. HART (FF-1092)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS CAPODANNO (FF-1093)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS PHARRIS (FF-1094)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS TRUETT (FF-1095)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N

COMBATANTS	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	EKG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
FRIGATE																		
USS VALDEZ (FF-1096)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS MOINESTER (FF 1097)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS GLOVER (FF-1098)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
GUIDED MISSILE FRIGATE																		
USS BROOKE (FFG-1)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS DUNCAN (FFG-10)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS CLARK (FFG-11)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS GEORGE PHILIP (FFG-12)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS SAMUEL E. MORISON (FFG-13)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS SIDES (FFG-14)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS ESTOCIN (FFG-15)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS CLIFTON SPRAGUE (FFG-16)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS JOHN A. MOORE (FFG-19)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS RAMSEY (FFG-2)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS ANTRIM (FFG-20)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS FLATLEY (FFG-21)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS LEWIS B. PULLER (FFG-23)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS JACK WILLIAMS (FFG-24)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS GALLERY (FFG-26)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS SCHOFIELD (FFG-3)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS RICHARD L. PAGE (FFG-5)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USS JULIUS A. FURER (FFG-6)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS OLIVER HAZARD PERRY (FFG-7)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS MCINERNEY (FFG-8)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS WADSWORTH (FFG-9)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS FAHRION (FFG-22)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS BOONE (FFG-28)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS STEVEN W. GROVES (FFG-29)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N

AUXILIARIES	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
DESTROYER TENDER																		
USS PRAIRIE (AD-15)	0	0	0	1	0	0	0	1	1	2	4	3	Y	Y	Y	Y	Y	Y
USS SIERRA (AD-18)	0	0	0	1	0	0	0	1	1	2	3	4	Y	Y	Y	Y	Y	Y
USS YOSEMITE (AD-19)	0	0	0	1	0	0	0	1	1	2	2	5	Y	Y	Y	Y	Y	Y
USS SAMUEL GOMPERS (AD-37)	0	0	0	1	0	0	1	1	1	3	4	6	Y	Y	Y	Y	Y	Y
USS PUGET SOUND (AD-38)	0	0	0	1	0	0	1	1	0	3	3	7	Y	Y	Y	Y	Y	Y
USS YELLOWSTONE (AD-41)	0	0	0	1	0	0	1	1	1	1	5	8	Y	Y	Y	Y	Y	Y
USS ACADIA (AD-42)	0	0	0	1	0	0	1	1	1	3	5	7	Y	Y	Y	Y	Y	Y
USS CAPE COD (AD-43)	0	0	1	0	0	0	1	1	1	2	4	7	Y	Y	Y	Y	Y	Y
AMMUNITION SHIP																		
USS SURIBACHI (AE-21)	0	0	0	0	0	0	0	0	0	0	0	2	N	N	N	N	N	N
USS MAUNA KEA (AE-22)	0	0	0	0	0	0	0	0	1	0	0	2	N	N	N	N	Y	N
USS NITRO (AE-23)	0	0	0	0	0	0	0	0	0	3	1	1	N	N	N	N	N	N
USS PYRO (AE-24)	0	0	0	0	0	0	0	0	0	1	0	2	N	N	N	N	N	N
USS HALEAKALA (AE-25)	0	0	0	0	0	0	0	0	1	0	0	2	N	N	N	N	N	N
USS BUTTE (AE-27)	0	0	0	0	0	0	0	0	0	1	2	0	Y	N	N	N	N	N
USS SANTA BARBARA (AE-28)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	Y	N	N	N
USS MOUNT HOOD (AE-29)	0	0	0	0	0	0	0	0	0	1	1	1	N	N	N	N	N	N
USS FLINT (AE-32)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	Y	N	N	N
USS SHASTA (AE-33)	0	0	0	0	0	0	0	0	0	1	1	1	N	N	Y	N	N	N
USS MOUNT BAKER (AE-34)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	Y	N	N	N
USS KISKA (AE-35)	0	0	0	0	0	0	0	0	1	0	0	3	N	N	Y	N	N	N
COMBAT STORE SHIP																		
USS MARS (AFS-1)	0	0	0	1	0	0	0	0	1	0	1	1	Y	N	Y	Y	N	N
USS SYLVANIA (AFS-2)	0	0	0	1	0	0	0	0	1	0	1	2	Y	N	Y	Y	N	N
USS NIAGARA FALLS (AFS-3)	0	0	0	1	0	0	0	0	0	1	1	2	Y	N	Y	Y	N	N
USS WHITE PLAINS (AFS-4)	0	0	0	1	0	0	0	0	1	0	2	0	Y	N	Y	Y	N	N
USS CONCORD (AFS-5)	0	0	0	1	0	0	0	0	1	0	1	1	Y	Y	Y	Y	N	N
USS SAN DIEGO (AFS-6)	0	0	0	1	0	0	0	0	0	1	1	2	Y	N	Y	N	N	N
USS SAN JOSE (AFS-7)	0	0	0	1	0	0	0	0	0	1	1	2	Y	N	Y	Y	N	N
(AGDS)																		
USS POINT LOMA (AGDS-2)	0	0	0	0	0	0	0	0	1	1	1	0	N	N	N	N	N	N

AUXILIARIES	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
MISCELLANEOUS FLAGSHIP																		
USS CORONADO (AGF-11)	0	0	0	1	0	0	0	0	1	1	1	0	Y	Y	Y	Y	Y	Y
OILER																		
USS CIMARRON (AO-177)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	Y	N	N	N
USS MONONGAHELA (AO-178)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS CALOOSAHATCHEE (AO-98)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS CANISTEO (AO-99)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS MERRIMACK (AO-179)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
FAST COMBAT SUPPORT																		
USS SACRAMENTO (AOE-1)	0	0	0	1	0	0	0	0	1	2	1	1	Y	Y	N	Y	Y	Y
USS CAMDEN (AOE-2)	0	0	0	1	0	0	0	0	0	1	2	0	Y	Y	Y	N	Y	Y
USS SEATTLE (AOE-3)	0	0	0	1	0	0	0	0	0	1	2	1	Y	Y	Y	N	Y	N
USS DETROIT (AOE-4)	0	0	0	1	0	0	0	1	1	0	0	2	Y	Y	Y	Y	Y	N
REPLENISHMENT OILER																		
USS WICHITA (AOR-1)	0	0	0	1	0	0	0	0	1	0	1	1	Y	N	Y	Y	N	N
USS MILWAUKEE (AOR-2)	0	0	0	1	0	0	0	0	1	0	2	1	Y	Y	Y	Y	Y	N
USS KANSAS CITY (AOR-3)	0	0	0	1	0	0	0	0	1	0	2	1	Y	Y	Y	Y	Y	N
USS SAVANNAH (AOR-4)	0	0	0	1	0	0	0	0	1	0	4	1	Y	Y	Y	Y	Y	N
USS WABASH (AOR-5)	0	0	0	1	0	0	0	0	1	1	0	2	Y	N	N	Y	N	N
USS KALAMAZOO (AOR-6)	0	0	0	1	0	0	0	0	1	0	0	1	Y	N	Y	Y	Y	N
USS ROANOKE (AOR-7)	0	0	0	1	0	0	0	0	1	0	1	2	Y	Y	Y	Y	Y	N
REPAIR SHIP																		
USS VULCAN (AR-5)	0	0	0	1	0	0	0	1	0	2	1	3	Y	Y	Y	Y	Y	Y
USS AJAX (AR-6)	0	0	0	1	0	0	0	1	2	0	1	3	Y	Y	Y	Y	Y	Y
USS HECTOR (AR-7)	0	0	0	1	0	0	0	1	1	1	2	5	Y	Y	Y	Y	Y	Y
USS JASON (AR-8)	0	0	0	1	0	0	0	1	0	2	2	3	Y	Y	Y	Y	Y	Y
SALVAGE SHIP																		
USS BOLSTER (ARS-38)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS CONSERVER (ARS-39)	0	0	0	0	0	0	0	0	0	2	0	0	N	N	N	N	N	N
USS HOIST (ARS-40)	0	0	0	0	0	0	0	0	1	1	0	0	N	N	N	N	N	N
USS OPPORTUNE (ARS-41)	0	0	0	0	0	0	0	1	0	1	0	0	N	N	N	N	N	N

AUXILIARIES	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
SALVAGE SHIP																		
USS RECLAIMER (ARS-42)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	Y	N
USS RECOVERY (ARS-43)	0	0	0	0	0	0	0	0	0	1	1	0	N	N	N	N	N	N
USS PRESERVER (ARS-8)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
FLEET TUG																		
USS MOCTOBI (ATF-105)	0	0	0	0	0	0	0	0	0	0	1	0	N	N	N	N	N	N
USS QUAPAW (ATF-110)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS TAKELMA (ATF-113)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS PAIUTE (ATF-159)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS PAPAGO (ATF-160)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
SALVAGE AND RESCUE SHIP																		
USS EDENTON (ATS-1)	0	0	0	0	0	0	0	0	0	2	0	0	N	N	N	N	N	N
USS BEAUFORT (ATS-2)	0	0	0	0	0	0	0	0	2	0	0	0	N	N	N	N	N	N
USS BRUNSWICK (ATS-3)	0	0	0	0	0	0	0	0	0	2	0	0	N	N	N	N	N	N
EXPERIMENTAL SHIP																		
USS NORTON SOUND (AVM-1)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	Y	N	N	N
FLOATING DOCK SHIP																		
USS DOLPHIN (AGSS-555)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
SUBMARINE TENDER																		
USS PROTEUS (AS-19)	0	0	1	3	0	0	0	0	3	3	2	5	Y	Y	Y	Y	Y	Y
USS DIXON (AS-37)	0	0	0	2	0	0	1	1	1	3	4	4	Y	Y	Y	Y	Y	Y
USS MCKEE (AS-41)	0	0	0	1	0	0	1	1	1	2	5	2	Y	Y	Y	Y	Y	Y
SUBMARINE RESCUE SHIP																		
USS PIGEON (ASR-21)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS FLORIKAN (ASR-9)	0	0	0	0	0	0	0	0	1	1	0	0	N	N	N	N	N	N

AMPHIBIOUS

	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
AMPHIBIOUS COMMAND SHIP																		
USS BLUE RIDGE (LCC-19)	0	0	0	1	0	0	0	1	0	1	5	2	Y	Y	Y	Y	Y	Y
USS MOUNT WHITNEY (LCC-20)	0	0	0	1	0	0	0	1	0	2	5	4	Y	Y	Y	Y	Y	Y
AMPHIBIOUS ASSAULT SHIP																		
USS TARAWA (LHA-1)	0	0	0	2	0	0	0	1	1	2	4	5	Y	Y	Y	Y	Y	Y
USS SAIPAN (LHA-2)	0	0	0	2	0	0	0	1	1	2	2	3	Y	Y	Y	Y	Y	Y
USS BELLEAU WOOD (LHA-3)	0	0	0	1	0	0	1	1	0	2	2	4	Y	Y	Y	Y	Y	Y
USS NASSAU (LHA-4)	0	1	0	0	0	0	1	0	0	2	4	5	Y	Y	Y	Y	Y	Y
USS PELELIU (LHA-5)	0	0	0	1	0	0	1	1	2	3	4	7	Y	Y	Y	Y	Y	Y
AMPHIBIOUS CARGO SHIP																		
USS CHARLESTON (LKA-113)	0	0	0	1	0	0	0	0	1	0	1	3	N	Y	N	N	Y	N
USS DURHAM (LKA-114)	0	0	0	0	0	0	0	0	0	1	2	3	Y	Y	Y	Y	N	N
USS MOBILE (LKA-115)	0	0	0	1	0	0	0	0	0	1	1	2	Y	Y	Y	N	Y	N
USS ST. LOUIS (LKA-116)	0	0	0	1	0	0	0	0	1	0	2	2	Y	Y	Y	N	Y	N
USS EL PASO (LKA-117)	0	0	0	0	0	0	0	0	1	0	3	1	Y	Y	Y	N	N	N
AMPHIBIOUS TRANSPORT DOCK SHIP																		
USS RALEIGH (LPD-1)	0	0	0	1	0	0	0	0	0	2	1	1	Y	Y	Y	Y	Y	Y
USS JUNEAU (LPD-10)	0	0	0	1	0	0	0	0	1	0	3	1	Y	Y	Y	Y	Y	Y
USS SHREVEPORT (LPD-12)	0	0	0	1	0	0	0	0	1	0	4	1	Y	Y	Y	Y	Y	Y
USS NASHVILLE (LPD-13)	0	0	0	1	0	0	0	1	1	1	1	3	Y	Y	Y	Y	Y	Y
USS TRENTON (LPD-14)	0	0	0	1	0	0	0	0	1	1	1	3	Y	Y	Y	Y	Y	Y
USS PONCE (LPD-15)	0	0	0	1	0	0	0	0	1	0	2	2	Y	Y	Y	Y	Y	N
USS VANCOUVER (LPD-2)	0	0	0	1	0	0	0	0	1	0	2	1	Y	Y	Y	Y	Y	Y
USS AUSTIN (LPD-4)	0	0	0	1	0	0	0	0	1	1	1	2	Y	Y	Y	N	Y	Y
USS OGDEN (LPD-5)	0	0	0	1	0	0	0	0	1	0	1	2	Y	Y	Y	N	Y	N
USS DULUTH (LPD-6)	0	0	0	1	0	0	0	0	0	1	2	4	Y	Y	Y	Y	Y	Y
USS CLEVELAND (LPD-7)	0	0	0	1	0	0	0	0	1	2	0	4	Y	Y	Y	Y	Y	Y
USS DUBUQUE (LPD-8)	0	0	0	1	0	0	0	0	1	0	5	0	Y	Y	Y	Y	Y	Y
USS DENVER (LPD-9)	0	0	0	1	0	0	0	0	0	1	4	3	Y	Y	Y	Y	Y	Y
AMPHIBIOUS ASSAULT SHIP--HELO																		
USS TRIPOLI (LPH-10)	0	0	0	1	0	0	0	1	1	1	2	6	Y	Y	Y	N	Y	N
USS NEW ORLEANS (LPH-11)	0	0	0	1	0	0	0	1	1	2	2	1	Y	Y	Y	Y	Y	Y
USS INCHON (LPH-12)	0	0	0	1	0	0	0	1	1	2	4	7	Y	Y	Y	Y	Y	Y
USS IWO JIMA (LPH-2)	0	0	0	1	0	0	0	1	1	2	[illegible]	6	Y	Y	Y	Y	Y	Y

AMPHIBIOUS

	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
AMPHIBIOUS ASSAULT SHIP--HELO																		
USS OKINAWA (LPH-3)	0	0	0	1	0	0	0	1	1	3	5	1	Y	Y	Y	Y	Y	Y
USS GUADALCANAL (LPH-7)	0	0	0	1	0	0	0	1	0	0	3	4	Y	Y	Y	Y	Y	Y
USS GUAM (LPH-9)	0	0	0	1	0	0	0	1	0	2	3	3	Y	Y	Y	Y	Y	Y
DOCK LANDING SHIP																		
USS THOMASTON (LSD-28)	0	0	0	0	0	0	0	0	1	1	1	0	N	N	N	N	N	N
USS PLYMOUTH ROCK (LSD-29)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS PORTLAND (LSD-37)	0	0	0	0	0	0	0	0	1	0	1	2	N	N	N	N	N	N
USS FORT SNELLING (LSD-30)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N
USS POINT DEFIANCE (LSD-31)	0	0	0	0	0	0	0	0	0	1	1	2	N	N	N	N	N	N
USS SPIEGEL GROVE (LSD-32)	0	0	0	0	0	0	0	0	1	1	0	1	N	N	N	Y	N	N
USS ALAMO (LSD-33)	0	0	0	0	0	0	0	0	1	0	1	1	N	N	N	N	N	N
USS ANCHORAGE (LSD-36)	0	0	0	0	0	0	0	0	1	0	2	3	Y	N	N	N	N	N
USS PENSACOLA (LSD-38)	0	0	0	0	0	0	0	0	0	1	2	0	N	N	N	N	N	N
USS MOUNT VERNON (LSD-39)	0	0	0	0	0	0	0	0	0	1	1	1	N	N	Y	Y	N	N
USS FORT FISHER (LSD-40)	0	0	0	0	0	0	0	0	1	0	2	0	Y	N	N	N	N	N
TANK LANDING SHIP																		
USS NEWPORT (LST-1179)	0	0	0	0	0	0	0	0	0	1	1	1	N	N	N	N	N	N
USS MANITOWOC (LST-1180)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	Y	N
USS SUMTER (LST-1181)	0	0	0	0	0	0	0	0	0	1	0	2	N	N	N	N	N	N
USS FRESNO (LST-1182)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS PEORIA (LST-1183)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	Y	N	N
USS FREDERICK (LST-1184)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS SCHENECTADY (LST-1185)	0	0	0	0	0	0	0	0	0	1	0	2	N	N	N	N	N	N
USS CAYUGA (LST-1186)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS TUSCALOOSA (LST-1187)	0	0	0	0	0	0	0	0	0	1	0	2	N	N	N	N	Y	N
USS SAGINAW (LST-1188)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS SAN BERNARDINO (LST-1189)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS BOULDER (LST-1190)	0	0	0	0	0	0	0	0	0	1	0	1	N	N	N	N	N	N
USS RACINE (LST-1191)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS SPARTANBURG COUNTY (LST-1192)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS FAIRFAX COUNTY (LST-1193)	0	0	0	0	0	0	0	0	0	1	0	2	N	N	N	N	N	N
USS LA MOURE COUNTY (LST-1194)	0	0	0	0	0	0	0	0	0	1	0	2	N	N	N	N	N	N
USS BARBOUR COUNTY (LST-1195)	0	0	0	0	0	0	0	0	0	1	0	2	N	N	N	N	N	N
USS HARLAN COUNTY (LST-1196)	0	0	0	0	0	0	0	0	1	0	0	2	N	N	N	N	N	N
USS BARNSTABLE COUNTY (LST-1197)	0	0	0	0	0	0	0	0	1	0	0	1	N	N	N	N	N	N
USS BRISTOL COUNTY (LST-1198)	0	0	0	0	0	0	0	0	1	0	1	0	N	N	N	N	N	N

AMPHIBIOUS

MEDICAL DEPARTMENT PERSONNEL — MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S

	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
OCEAN MINESWEEPER																		
USS CONSTANT (MSO-427)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS ENGAGE (MSO-433)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS ENHANCE (MSO-437)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS ESTEEM (MSO-438)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS EXCEL (MSO-439)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	Y	N
USS EXPLOIT (MSO-440)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS EXULTANT (MSO-441)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS FEARLESS (MSO-442)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS FIDELITY (MSO-443)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS FORTIFY (MSO-446)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS ILLUSIVE (MSO-448)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS IMPERVIOUS (MSO-449)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS IMPLICIT (MSO-455)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS INFLICT (MSO-456)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS PLUCK (MSO-464)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS CONQUEST (MSO-488)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS GALLANT (MSO-489)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS LEADER (MSO-490)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS PLEDGE (MSO-492)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS ADROIT (MSO-509)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS AFFRAY (MSO-511)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N

SUBMARINES	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
CONVENTIONAL SUBMARINE																		
USS GRAYBACK (SS-574)	0	0	0	1	0	0	0	0	1	0	1	0	N	N	Y	N	N	N
USS DARTER (SS-576)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
(SSAG)																		
USS GUDGEON (SSAG-567)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
FLEET BALLISTIC MISSILE SUBMARINE																		
USS GEORGE WASHINGTON (SSBN-598)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS PATRICK HENRY (SSBN-599)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS LOS ANGELES (SSBN-688)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS OHIO (SSBN-726)	0	0	0	1	0	0	0	1	0	0	0	0	N	N	N	Y	Y	N
ATTACK SUBMARINE																		
USS SEAWOLF (SSN-575)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	Y	Y	N	N
USS SKATE (SSN-578)	0	0	0	0	0	0	0	0	0	0	1	0	N	N	N	N	N	N
USS SWORDFISH (SSN-579)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS SARGO (SSN-583)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS SEADRAGON (SSN-584)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS SKIPJACK (SSN-585)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS SCULPIN (SSN-590)	0	0	0	0	0	0	0	0	0	0	1	0	N	N	N	N	N	N
USS PLUNGER (SSN-595)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS BARB (SSN-596)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS POLLACK (SSN-603)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS HADDO (SSN-604)	0	0	0	0	0	0	0	0	0	0	1	0	N	N	N	N	N	N
USS THOMAS A. EDISON (SSN-610)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS FLASHER (SSN-613)	0	0	0	0	0	0	0	0	0	0	1	0	N	N	N	N	N	N
USS HADDOCK (SSN-621)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS TAUTOG (SSN-639)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS POGY (SSN-647)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS ASPRO (SSN-648)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS QUEENFISH (SSN-651)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS PUFFER (SSN-652)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	Y	N
USS GURNARD (SSN-662)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS GUITARRO (SSN-665)	0	0	0	0	0	0	0	1	0	0	0	0	N	N	N	N	N	N
USS PINTADO (SSN-672)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS TUNNY (SSN-682)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS CAVALLA (SSN-684)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS OMAHA (SSN-692)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS NEW YORK CITY (SSN-696)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N

SUBMARINES	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
ATTACK SUBMARINE																		
USS INDIANAPOLIS (SSN-697)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS SAN FRANCISCO (SSN-711)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USS SAM HOUSTON (SSN-609)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USS LA JOLLA (SSN-701)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N

MILITARY SEALIFT COMMAND	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
MSC AMMUNITION SHIP																		
USNS KILAUEA (T-AE-26)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
MSC COMBAT STORE SHIP																		
USNS SIRIUS (T-AFS-8)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS SPICA (T-AFS-9)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
HYDRO RESEARCH SHIP																		
USNS KINGSPORT (T-AG-164)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS VANGUARD (T-AG-194)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
RANGE INSTRUMENTATION SHIP																		
USNS REDSTONE (T-AGM-20)	0	0	0	0	1	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS RANGE SENTINEL (T-AGM-22)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS OBSERVATION ISLAND (T-AGM-23)	0	0	0	0	0	1	0	0	0	0	0	0	Y	N	Y	Y	N	N
OCEAN RESEARCH SHIP																		
USNS MIZAR (T-AGOR-11)	0	0	0	0	0	1	0	0	0	0	0	0	N	Y	N	N	N	N
USNS DE STEIGUER (T-AGOR-12)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS BARTLETT (T-AGOR-13)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS LYNCH (T-AGOR-7)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
SURVEYING SHIP																		
USNS BOWDITCH (T-AGS-21)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USNS DUTTON (T-AGS-22)	0	0	0	0	0	0	0	0	1	0	0	0	N	N	N	N	N	N
USNS SILAS BENT (T-AGS-26)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS KANE (T-AGS-27)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS CHAUVENET (T-AGS-29)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USNS HARKNESS (T-AGS-32)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N
USNS WILKES (T-AGS-33)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS WYMAN (T-AGS-34)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS H. H. HESS (T-AGS-38)	0	0	0	0	0	0	0	0	0	1	0	0	N	N	N	N	N	N

MILITARY SEALIFT COMMAND

	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	ECG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
CARGO SHIP																		
USNS EURMAN (T-AK-280)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS MARSHFIELD (T-AK-282)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS NORTHERN LIGHT (T-AK-284)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS SOUTHERN CROSS (T-AK-285)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
VEHICLE CARGO SHIP																		
USNS MERCURY (T-AKR-10)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS JUPITER (T-AKR-11)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS COMET (T-AKR-7)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS METEOR (T-AKR-9)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
TANKER																		
USNS MISPILLION (T-AO-105)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS NAVASOTA (T-AO-106)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS PAWCATUCK (T-AO-108)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	Y	Y	N
USNS WACCAMAW (T-AO-109)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS MISSISSINEWA (T-AO-144)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS HASSAYAMPA (T-AO-145)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS KAWISHIWI (T-AO-146)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS TRUCKEE (T-AO-147)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS PONCHATOULA (T-AO-148)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS TALUGA (T-AO-62)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS PASSUMPSIC (T-AO-107)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
CABLE SHIP																		
USNS NEPTUNE (T-ARC-2)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	N	N	N
USNS AEOLUS (T-ARC-3)	0	0	0	0	0	1	0	0	0	0	0	0	N	N	N	Y	N	N
MSC FLEET TUG																		
USNS POWHATAN (T-ATF-166)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS NARRAGANSET (T-ATF-167)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS CATAWBA (T-ATF-168)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS NAVAJO (T-ATF-169)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS MOHAWK (T-ATF-170)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS SIOUX (T-ATF-171)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS APACHE (T-ATF-172)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N

MILITARY SEALIFT COMMAND	MEDICAL DEPARTMENT PERSONNEL												MEDICAL DEPARTMENT EQUIPMENT AND SUPPORT NEC'S					
	CAPT	CDR	LCDR	LT	PA	NURSE	MSC	HMCS	HMC	HM1	HM2	HM3	X-RAY	X-RAY TECH	SSG	LIFEPAK 5/6	LAB TECH	DENTAL CAPABILITY
(T-AOG)																		
USNS NODAWAY (T-AOG-78)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS ALATNA (T-AOG-81)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N
USNS CHATTAHOUCHEE (T-AOG-82)	0	0	0	0	0	0	0	0	0	0	0	0	N	N	N	N	N	N

APPENDIX C

Shipboard Dental Departments by Ship Type

Ship Type	Number of Ships Sampled	Number of Ships with Dental Departments	Number of Filled Dental Billets
Destroyer Tenders (AD)	8	8 (100%)	98
Flagship (Miscellaneous) (AGF)	1	1 (100%)	2
Fast Combat Support (AOE)	4	2 (50%)	7
Repair Ship (AR)	4	3 (75%)	25
Battleship (BB)	1	1 (100%)	4
Nuclear Guided Missile Cruiser (CGN)	9	1 (11%)	5
Amphibious Command Ship (LCC)	2	2 (100%)	9
Amphibious Assault Ship (LHA)	5	5 (100%)	18
Amphibious Transport Dock (LPD)	13	11 (85%)	37
Amphibious Assault Ship-Helicopter (LPH)	7	6 (86%)	21
Submarine Tender (AS)	3	3 (100%)	34
Aircraft Carrier (CV-CVN)	12	12 (100%)	185

Shipboard Dental Department Staff by Ship

	Staff										
	CAPT	CDR	LCDR	LT	LTJG	ENS	DTC	DT1	DT2	DT3	Striker DA/DN
DESTROYER TENDER (AD)											
USS PRAIRIE (AD-15)	-	1	2	1	-	-	1	2	2	-	-
USS SIERRA (AD-18)	-	1	1	2	-	-	1	2	1	3	-
USS YOSEMITE (AD-19)	-	1	1	2	-	-	1	1	1	2	-
USS SAMUEL GOMPERS (AD-37)	-	1	2	1	-	-	-	2	2	5	3
USS PUGET SOUND (AD-38)	-	1	-	2	-	-	1	3	2	1	3
USS YELLOWSTONE (AD-41)	-	1	1	2	-	-	1	1	1	5	0
USS ACADIA (AD-42)	-	1	2	1	-	-	1	4	-	3	2
USS CAPE COD (AD-43)	-	1	1	2	-	-	1	3	1	3	2
FLAGSHIP (MISCELLANEOUS) (AGF)											
USS CORONADO (AGF-11)	-	-	1	-	-	-	-	-	-	-	1
FAST COMBAT SUPPORT (AOE)											
USS SACRAMENTO (AOE-1)	-	-	-	1	-	-	-	-	1	-	1
USS CAMDEN (AOE-2)	-	-	-	1	-	-	-	1	-	-	2
REPAIR SHIP (AR)											
USS VULCAN (AR-5)	-	1	-	-	-	-	-	1	3	1	2
USS AJAX (AR-6)	-	1	2	-	-	-	-	-	3	4	-
USS JASON (AR-8)	-	-	1	2	-	-	-	1	2	1	-
BATTLESHIP (BB)											
USS NEW JERSEY (BB-62)	-	1	-	-	-	-	1	-	1	-	1
NUCLEAR GUIDED MISSILE CRUISER (CGN)											
USS LONG BEACH (CGN-9)	-	-	1	-	-	-	-	1	-	-	3

	Staff										Striker
	CAPT	CDR	LCDR	LT	LTJG	ENS	DTC	DT1	DT2	DT3	DA/DN
AMPHIBIOUS COMMAND SHIP (LCC)											
USS BLUERIDGE (LCC-19)	–	–	1	–	–	–	–	–	1	–	3
USS MOUNT WHITNEY (LCC-20)	–	–	1	–	–	–	–	–	2	–	1
AMPHIBIOUS ASSAULT SHIP (LHA)											
USS TARAWA (LHA-1)	–	–	1	–	–	–	–	–	1	1	–
USS BELLEAU WOOD (LHA-3)	–	–	–	1	–	–	–	–	1	1	–
USS NASSAU (LHA-4)	–	–	–	1	–	–	–	–	1	2	–
USS PELELIU (LHA-5)	–	–	–	1	–	–	–	–	–	1	2
USS SAIPAN (LHA-2)	–	–	1	–	–	–	–	–	1	2	–
AMPHIBIOUS TRANSPORT DOCK (LPD)											
USS RALEIGH (LPD-1)	–	–	–	1	–	–	–	–	1	–	1
USS JUNEAU (LPD-10)	–	–	–	1	–	–	–	–	2	–	1
USS SHREVEPORT (LPD-12)	–	–	–	1	–	–	–	–	2	1	1
USS NASHVILLE (LPD-13)	–	–	1	–	–	–	–	–	1	–	1
USS TRENTON (LPD-14)	–	–	1	–	–	–	–	1	–	–	1
USS PONCE (LPD-15)	–	–	1	–	–	–	–	1	–	1	1
USS AUSTIN (LPD-4)	–	–	1	–	–	–	–	–	1	1	–
USS OGDEN (LPD-5)	–	–	–	1	–	–	–	–	1	1	–
USS CLEVELAND (LPD-7)	–	–	1	–	–	–	–	–	–	2	–
USS DUBUQUE (LPD-8)	–	–	1	–	–	–	–	–	–	2	–
USS DENVER (LPD-9)	–	–	1	–	–	–	–	–	1	–	1
AMPHIBIOUS ASSAULT SHIP-HELICOPTER (LPH)											
USS NEW ORLEANS (LPH-11)	–	–	1	–	–	–	–	–	1	1	1
USS INCHON (LPH-12)	–	–	–	1	–	–	–	–	1	1	–
USS IWO JIMA (LPH-2)	–	–	1	–	–	–	–	–	1	1	–
USS OKINAWA (LPH-3)	–	–	1	–	–	–	–	–	2	–	1
USS GUADALCANAL (LPH-7)	–	–	1	–	–	–	–	–	1	–	1
USS GUAM (LPH-9)	–	–	1	–	–	–	–	–	1	1	1

	Staff										
	CAPT	CDR	LCDR	LT	LTJG	ENS	DTC	DT1	DT2	DT3	Striker DA/DN
SUBMARINE TENDER (AS)											
USS DIXON (AS-37)	-	1	1	1	-	-	1	2	-	3	-
USS McKEE (AS-41)	-	1	1	1	-	-	1	3	2	1	4
USS PROTEUS (AS-19)	-	1	-	1	-	-	2	-	3	4	-
AIRCRAFT CARRIERS (CV-CVN)											
USS MIDWAY (CV-41)	-	-	3	1	-	-	1	-	3	4	4
USS CORAL SEA (CV-43)	1	-	1	2	-	-	1	1	2	4	1
USS SARATOGA (CV-60)	-	1	1	2	-	-	1	-	2	2	-
USS RANGER (CV-61)	-	1	1	2	-	-	1	1	3	5	2
USS INDEPENDENCE (CV-62)	-	1	2	1	-	-	1	1	3	-	5
USS KITTY HAWK (CV-63)	-	2	1	1	-	-	1	3	-	5	5
USS AMERICA (CV-66)	-	1	1	3	-	-	2	-	2	5	5
USS JOHN F. KENNEDY (CV-67)	-	1	3	1	-	-	2	1	2	7	3
USS ENTERPRISE (CVN-65)	-	1	2	2	-	-	1	1	1	4	6
USS NIMITZ (CVN-68)	-	2	1	2	-	-	2	-	2	2	6
USS DWIGHT D. EISENHOWER (CVN-69)	-	2	-	3	-	-	2	-	2	4	4
USS LEXINGTON (AVT-16)	-	-	1	1	-	-	1	1	1	-	3
TOTAL NUMBER OF PERSONNEL	1	26	50	49	0	0	28	38	71	97	85

APPENDIX D

Operational Characteristics by Ship Type

	Ship Type	Number of Ships			Time at Sea			Man-Days at Sea			Patient Visits		
		Atlantic	Pacific	Total	Atlantic	Pacific	Total	Atlantic	Pacific	Total	Atlantic	Pacific	Total
PHYSICIAN	**Aircraft Carriers**	7	5	12	38%	48%	43%	3,409,964	2,730,064	6,140,028	54,528	46,809	101,337
	Surface Ships	35	45	80	36%	27%	31%	2,238,594	2,315,688	4,554,282	31,304	50,256	81,560
	- Combatant	6	4	10	40%	24%	34%	344,626	281,200	625,826	5,542	6,907	12,449
	- Auxiliary	14	24	38	32%	27%	29%	695,079	911,198	1,606,277	10,842	22,275	33,117
	- Amphibious	15	17	32	27%	37%	31%	1,198,889	1,123,290	2,322,179	14,920	21,074	35,994
CORPSMAN	**Surface Ships**	139	123	262	30%	30%	30%	3,214,576	2,836,506	6,051,082	51,315	65,793	117,108
	- Combatant	96	81	177	30%	31%	31%	2,295,279	2,122,513	4,417,792	35,720	46,721	82,441
	- Auxiliary	16	17	33	33%	26%	30%	347,104	275,271	622,375	5,767	7,980	13,747
	- Amphibious	27	25	52	29%	25%	27%	572,193	438,722	1,010,915	9,828	11,092	20,920
	Submarines	--	42	42	—	26%	26%	—	318,361	318,361	—	7,548	7,548
	Military Sealift Command	24	30	54	34%	41%	38%	215,854	261,641	477,495	4,958	6,117	11,075
	Total	205	245	450	32%	30%	31%	9,078,988	8,462,260	17,541,248	142,105	176,523	318,628

APPENDIX E

Average Number of Medical Communications by Ship Type for the 9-Month Study Period

Ship Type	Number of Ships	Average Number of Communications per Ship
Aircraft Carriers		
AVT	1	1.00
CV	8	1.00
CVN	3	3.66
Combatants		
BB	1	0.0
CG	19	1.68
CGN	9	.77
DD	37	2.62
DDG	38	2.31
FF	59	2.23
FFG	24	1.45
Auxiliaries		
AD	8	.12
AE	12	2.33
AFS	7	1.14
AGDS	1	0.0
AGF	1	1.00
AGSS	1	0.0
AO	5	2.60
AOE	4	1.75
AOR	7	1.57
AR	4	0.0
ARS	7	.14
AS	3	0.0
ASR	2	2.00
ATF	5	.20
ATS	3	.33
AVM	1	3.00
Amphibious		
LCC	2	1.50
LHA	5	1.60
LKA	5	2.80
LPD	13	3.15
LPH	7	2.00
LSD	11	3.09
LST	20	1.85
MSO*	21	.61

*Although MSOs are not amphibious ships, they were included in this group because they are relatively small and often operate in coastal waters.

Ship Type	Number of Ships	Average Number of Communications per Ship
Submarines		
SS	3	1.00
SSAG	1	2.00
SSBN	5	.40
SSN	33	.24
Military Sealift Command		
T-AE	1	3.00
T-AFS	2	1.00
T-AG	2	1.00
T-AGM	3	1.66
T-AGOR	4	1.75
T-AGS	9	2.55
T-AK	4	.50
T-AKR	4	3.75
T-AO	12	1.66
T-AOG	3	0.0
T-ARC	3	1.00
T-ATF	7	.14

APPENDIX F

Average Number of Medevacs by Ship Type

for the 9-Month Study Period

Ship Type	Number of Ships	Average Number of Medevacs per Ship
Aircraft Carriers		
AVT	1	4.00
CV	8	11.38
CVN	3	15.00
Combatants		
BB	1	2.00
CG	19	1.53
CGN	9	1.67
DD	37	1.86
DDG	38	1.87
FF	59	1.73
FFG	24	.92
Auxiliaries		
AD	8	.75
AE	12	1.92
AFS	7	1.71
AGDS	1	0.0
AGF	1	1.00
AGSS	1	0.0
AO	5	1.80
AOE	4	1.00
AOR	7	3.00
AR	4	0.0
ARS	7	.14
AS	3	0.0
ASR	2	.50
ATF	5	.60
ATS	3	1.00
AVM	1	4.00
Amphibious		
LCC	2	2.50
LHA	5	1.60
LKA	5	.80
LPD	13	3.23
LPH	7	3.14
LSD	11	2.82
LST	20	1.50
MSO*	21	.38

Ship Type	Number of Ships	Average Number of Medevacs per Ships
Submarines		
SS	3	.33
SSAG	1	1.00
SSBN	5	.20
SSN	33	.12
Military Sealift Command		
T-AE	1	3.00
T-AFS	2	1.50
T-AG	2	1.00
T-AGM	3	2.33
T-AGOR	4	0.0
T-AGS	9	1.11
T-AK	4	.25
T-AKR	4	.50
T-AO	12	1.50
T-AOG	3	0.0
T-ARC	3	.33
T-ATF	7	.14

*Although MSOs are not amphibious ships, they were included in this group because they are relatively small and often operate in coastal waters.

APPENDIX G

Medevacs by Diagnostic Categories

INFECTIVE AND PARASITIC DISEASES	CASES
Herpes zoster	2
Infectious hepatitis; all viral hepatitis	48
Mumps	1
Viral conjunctivitis	3
Viral infection unspecified; excluding influenza	1
Syphilis - all sites and stages	1
All other infective and parasitic diseases	4
NEOPLASMS	
Urinary and male genitalia	1
Hodgkin's disease	2
Neoplasms - not yet determined as benign or malignant	3
ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES	
Diabetes mellitus	8
DISEASES OF BLOOD AND BLOOD-FORMING ORGANS	
Microcytic anaemia, iron deficiency anaemia	1
Chronic and nonspecific lymphadenitis	1
MENTAL DISORDERS	
PSYCHOSES	
Schizophrenia	16
Affective psychosis	5
Other psychosis	3
NEUROSES	
Anxiety neurosis	1
Depressive neurosis	5
Other neurosis	1
OTHER MENTAL AND PSYCHOLOGICAL DISORDERS	
Transient situational disturbance	1
Behaviour disorders NEC	12
Abuse of alcohol	2
Personality and character disorder	6
Other mental and psychological disorders	1
ATTEMPTED SUICIDE	

DISEASES OF THE NERVOUS SYSTEM AND SENSE ORGANS

DISEASES OF THE NERVOUS SYSTEM

Epilepsy - all types	5
Migraine	1
Other diseases of the nervous system	8

DISEASES OF THE EYE

Conjunctivitis and ophthalmia	1
Other diseases of the eye	4

DISEASES OF THE EAR

Otitis externa	2
Deafness, partial or complete	1
Other diseases of ear and mastoid process	3

DISEASES OF THE CIRCULATORY SYSTEM

Acute myocardial infarction and subacute ischaemic heart disease	9
Chronic ischaemic heart disease	5
Other atherosclerotic heart disease	1
Heart failure	2
Atrial fibrillation or flutter	1
Paroxysmal tachycardia	3
All other heart disease	2

BLOOD PRESSURE PROBLEMS

Hypertension with target organ involvement	2
Hypertension NOS	5

DISEASES OF THE VASCULAR SYSTEM

Cerebrovascular disease	1
Pulmonary embolism and infarction	3
Phlebitis and thrombophlebitis	4
Haemorrhoids, thrombosed external piles	1

DISEASES OF THE RESPIRATORY SYSTEM

URTI acute	1
Tonsillitis acute	3
Pneumonia	9
Asthma	5
Other diseases of the respiratory system	7

DISEASES OF THE DIGESTIVE SYSTEM

Diseases of the teeth and supporting structures		52
- Infection (primarily periapical abscess)	26	
- Wisdom Teeth (infected or impacted)	9	
- Caries	4	
- Undiagnosed/unspecified pain (e.g., toothache, dental pain)	13	
Diseases of the mouth, tongue, and salivary glands		1
Other peptic ulcer		1
Appendicitis - all types		38
Inguinal hernia		13
Other hernia		2
Diverticular disease of intestines		1
Constipation		1
Anal fissure and fistula, perianal abscess		1
Proctitis		1
Bleeding from rectum, gastrointestinal bleeding		5
Cirrhosis and other liver disease		3
Cholecystitis, cholelithiasis, cholangitis and other diseases of gallbladder and biliary tract		1
Other diseases of digestive system		3

DISEASES OF THE GENITOURINARY SYSTEM

DISEASES OF THE URINARY SYSTEM

Acute pyelonephritis, pyelitis	1
Urinary calculus	10
Other diseases of the kidney, ureter, and bladder	8

DISEASES OF THE MALE GENITAL ORGANS

Prostatitis, seminal vesiculitis	2
Hydrocoele	1
Orchitis and epididymitis	3
Other diseases of the male genitalia	1

DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE

Boil and carbuncle, cellulitis, abscess	10
Lymphadenitis - acute	1
Eczema and dermatitis	2
Urticaria, allergic oedema, angioedema	1
Other diseases of the skin and subcutaneous tissue	2

DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE

ARTHRITIS	
Traumatic arthritis	1
NONARTICULAR RHEUMATISM	
Shoulder syndromes	2
Bursitis, tenosynovitis, peritendinitis, synovitis	1
SYNDROMES RELATED TO VERTEBRAL COLUMN	
Syndromes related to cervical spine	1
Osteoarthritis of lumbar spine	2
Low back pain w/o symptoms of radiation, backache NOS, lumbalgia	3
Other lumbar syndromes	6
Acquired deformities of spine	1
Chronic internal derangement of joint	2
Other diseases of musculoskeletal system and connective tissue	4

PHYSICAL SIGNS, SYMPTOMS, AND ILL-DEFINED CONDITIONS

CENTRAL NERVOUS SYSTEM AND PERIPHERAL NERVES	
Convulsions	1
Disturbance of sensation, paraesthesia	3
CARDIOVASCULAR AND LYMPHATIC SYSTEMS	
Chest pain	14
Syncope, faint, blackout	3
Oedema	2
Enlarged lymph nodes	1
RESPIRATORY SYSTEM	
Painful respiration, pleurodynia, pleuritic pain	2
GASTROINTESTINAL SYSTEM AND ABDOMEN	
Anorexia	1
Hepatomegaly, splenomegaly	1
Abdominal pain	15
LIMBS AND JOINTS	
Joint swelling	1

GENERAL	
Fever of undetermined cause	1
Malaise, fatigue, tiredness	1
Mass or localized swelling NOS and NYD	5
UNEXPLAINED ABNORMAL INVESTIGATIONS	
Abnormal urine test	3
All other signs, symptoms, and ill-defined conditions	6
ACCIDENTS, POISONINGS, AND VIOLENCE	
FRACTURES, FRACTURE-DISLOCATIONS	
Skull and facial bones	11
Vertebral column with or without cord lesion	16
Ribs	1
Clavicle	3
Humerus	2
Radius and ulna	8
Carpals, metacarpals, tarsals, metatarsals	27
Phalanges - foot or hand	19
Femur	4
Tibia and fibula	21
All other fractures	7
DISLOCATIONS AND SUBLUXATIONS	
Knee and patella	6
All other dislocations and subluxations	6
SPRAINS AND STRAINS	
Wrist, hand, and fingers	2
Knee and lower leg	1
Ankle	3
Rest of vertebral column	6
OTHER TRAUMA	
Head injury, concussion, intracranial injury	10
Laceration, open wound, traumatic amputation	33
Abrasion, scratch, blister	1
Bruise, contusion, crushing with intact skin surface	14
Burns and scalds - all degrees	15
Foreign body in tissues	1
Foreign body in eye	7
Late effects of trauma and adverse effects	3
Other injuries and trauma	13

ADVERSE EFFECTS	
Adverse effects of medicinal agents	4
Adverse effects of other chemicals	1
Complications of surgery and medical care	9
Adverse effects of physical factors	9
MISSING DIAGNOSIS	1Ø
TOTAL NUMBER OF CASES	743

APPENDIX H

Medevac Diagnosis Discrepancies between

Initiating and Receiving Facilities

Medevac Diagnosis	Receiving Facility Diagnosis
1. **Appendicitis**	
Appendicitis*	Intestinal disease of proven bacterial or protozoal origin; including food poisoning
Appendicitis*	Intestinal disease, presumed infectious, of viral or unknown origin; including viral gastro-enteritis
Appendicitis*	Disease of respiratory system; including spontaneous pneumo-thorax, pneumonoconiosis
Appendicitis	Intestinal disease, presumed infectious, of viral or unknown origin; including viral gastro-enteritis
Appendicitis	Peptic ulcer; including NOS, gastric gastrojejeunal
Appendicitis	Disease of the kidney, ureter, and bladder, including urethral stricture
Appendicitis	Abdominal pain; rectal and anal pain; diarrhea; constipation
2. **Fracture/Dislocation**	
Vertebral column	Bruise, contusion, crushing with intact skin surface; including eye, haematoma
Vertebal column	Bruise, contusion, crushing with intact skin surface; including eye, haematoma

*Indicates Medevac diagnosis made by a physician.

Medevac Diagnosis	Receiving Facility Diagnosis
2. **Fracture Dislocation** (continued)	
Vertebral column	Head injury, concussion, intracranial injury (without skull fracture); including late effects
Phalanges - foot or hand	Bruise, contusion, crushing with intact skin surface; including eye, haematoma
Phalanges - foot or hand	Laceration, open wound, traumatic amputation; including injuries to teeth and eardrum, puncture wound
Carpals, metacarpals; tarsals, metatarsals	Bruise, contusion, crushing with intact skin surface; including eye, haematoma
All other fractures, including ill-defined	Bruise, contusion, crushing with intact skin surface; including eye, haematoma
3. **Laceration**, open wound, traumatic amputation, including injuries to teeth and eardrum, puncture wound	
Laceration...*	Fracture/dislocation in phalanges - hand or foot
Laceration...*	Fracture/dislocation in phalanges - hand or foot
Laceration...*	Disease of teeth and supporting structures; including dental abscess
4. **Infectious hepatitis**	
Infectious hepatitis*	Infectious mononucleosis, glandular fever
Infectious hepatitis	Intestinal disease, presumedinfectious, of viral or unknown origin; including gastroenteritis

*Indicates Medevac diagnosis made by a physician.

Medevac Diagnosis	Receiving Facility Diagnosis
4. **Infectious hepatitis** (continued)	
Infectious hepatitis	Sickle cell anemia and other hereditary haemolytic anemias
5. **Inguinal hernia**	
Inguinal hernia	Orchitis and epididymitis
Inguinal hernia	Orchitis and epididymitis
Inguinal hernia	Sprains and strains; including ill-defined
6. **Heart Disease**...	
Acute myocardial infarction and subacute ischaemic heart disease*	Chest pain, including praecordial; excluding painful respiration, pleuritic pain
Chronic ischaemic heart disease; including angina pectoris, asymptomatic ischaemic heart disease	Pleural effusion, NOS
All other heart disease; including abnormal ECG, pericarditis, and other disturances of heart rate or rhythm	Disease of digestive system; including pancreatic disease, intestinal obstruction, peritonitis
7. **Bruise, contusion**, crushing with intact skin surface; including eye, haematoma	
Bruise, contusion...	Fracture/dislocation in skull and facial bones
Bruise, contusion...	Fracture/dislocation in phalanges - hand or foot
8. **Sprain/Strain**	
Wrist, hand, and fingers	Laceration, open wound, traumatic amputation
Vertebral column other than neck	Congenital anomaly

*Indicates Medevac diagnosis made by a physician.

Medevac Diagnosis	Receiving Facility Diagnosis
9. **Other injuries and trauma**; including multiple trauma NYD	
Other injuries and trauma*	Fracture/dislocation in vertebral column
Other injuries and trauma	Adverse effects of physical factors (e.g., heat, cold, pressure), including frost-bite; excluding sunburn
10. **Head injury**, concussion, intracranial injury (with-out skull fracture)	
Head injury...*	Hysterical and hypochondriacal neurosis (including anxiety causing a somatic complaint)
Head injury...	Bruise, contusion, crushing with intact skin surface; including eye, haematoma
11. **Abdominal pain**; rectal and anal pain; diarrhea; con-stipation	
Abdominal pain...*	Hysterical and hypochondriacal neurosis (including anxiety causing a somatic complaint)
Abdominal pain...	Microcytic anemia, iron deficiency anemia
12. **Complications of surgery and medical care**, including wound infection or disruption (as from prosthetic device)	
Complications of surgery...	Disease of teeth and supporting structures; including dental abscess
Complications of surgery...	Laceration, open wound, trau-matic amputation; including injuries to teeth and eardrum, puncture wound

*Indicates Medevac diagnosis made by a physician.

Medevac Diagnosis	Receiving Facility Diagnosis
13. **Diabetes mellitus**	
Diabetes mellitus*	Bruise, contusion, crushing with intact skin surface; including eye, haematoma
14. **Chronic and nonspecific lymphadenitis** (excluding enlarged lymph node)	
Chronic lymphadenitis...*	Edema; including fluid retention
15. **Malaise, fatigue, tiredness**	
Malaise...	Infectious hepatitis
16. **Foreign body in tissues**	
Foreign body...	Laceration, open wound, traumatic amputation; including injuries to teeth and eardrum, puncture wound
17. **Neoplasms, not yet determined whether benign or malignant**	
Neoplasm...*	Headache, including face pain; excluding migraine
18. **Syncope, faint, blackout**; functional and undiagnosed heart murmurs	
Syncope, faint, blackout...	Headache, including face pain; excluding migraine
19. **Constipation**	
Constipation	Other diseases of digestive system, including pancreatic disease, intestinal obstruction, peritonitis

*Indicates Medevac diagnosis made by a physician.

Medevac Diagnosis	Receiving Facility Diagnosis
20. **Boil and carbuncle**; cellulitis; abscess	
Boil and carbuncle...	Adverse effects of chemicals, including lead, excluding contact dermatitis, burns
21. **Hydrocoele**	
Hydrocoele*	Inguinal hernia
22. **Paroxysmal tachycardia**	
Paroxysmal tachycardia	Acute bronchitis
23. **Prostatitis, seminal vesiculitis**	
Prostatitis...	Proctitis, including rectal and anal pain
24. **Pneumonia; pleural effusion, NOS**	
Pneumonia...	Tonsillitis (acute); quinsy
25. **Other diseases of the kidney, ureter, and bladder** (including urethral stricture)	
Other diseases of the kidney...	Prostatitis, seminal vesiculitis
26. **Other diseases of respiratory system**; including spontaneous pneumothorax, deviated nasal septum, pneumonoconiosis	
Other diseases of respiratory system...	Other diseases of musculoskeletal system and connective tissue (related to vertebral column); including weakness of muscle or joint

*Indicates Medevac diagnosis made by a physician.

Medevac Diagnosis	Receiving Facility Diagnosis
27. **Other diseases of digestive system**, including pancreatic disease, intestinal obstruction, peritonitis	
Other diseases of digestive system...*	Constipation
28. **Other disease of musculoskeletal system and connective tissue** (related to vertebral column); including weakness in muscle or joint	
Other diseases of musculoskeletal system and connective tissue...*	Laceration, open wound, traumatic amputation; including injuries to teeth and eardrum, puncture wound
29. **Other lumbar syndromes**; including prolapsed or degenerated lumbar disc, sciatica	
Other lumbar syndromes...	Hysterical and hypochondriacal neurosis; including anxiety causing a somatic complaint

*Indicates Medevac diagnosis made by a physician.

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A 9-month study of all U.S. Navy surface ships (N=354), Pacific Fleet submarines (N=42), and all ships of the Military Sealift Command (N=54) was conducted to (1) document the frequency of, and diagnostic factors precipitating, medical communications and evacuations, and (2) determine the potential need for telemedicine capabilities aboard ship. Supplementary analyses were conducted to identify operational and medical staffing factors associated with patient visit rate at sea.

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During the course of the study, a total of 752 medical communications and 743 Medevacs were documented aboard ships at sea. These figures extrapolate to an annual incidence of 1,003 medical communications and 991 Medevacs. The principal diagnostic categories associated with both Medevacs and medical communications included injuries, primarily fractures and lacerations; and digestive problems , primarily teeth and supporting structures and suspected appendicitis. On a case-by-case basis, senior medical department representatives indicated that 46% of the medical communications could have been improved significantly and 28% of the Medevacs probably could have been prevented if they had had the ability to transmit data through medical telecommunications technologies.